SIEMENS

Ingenuity for life

SITRAIN® Training for Industry

2016 course catalog

usa.siemens.com/sitrain

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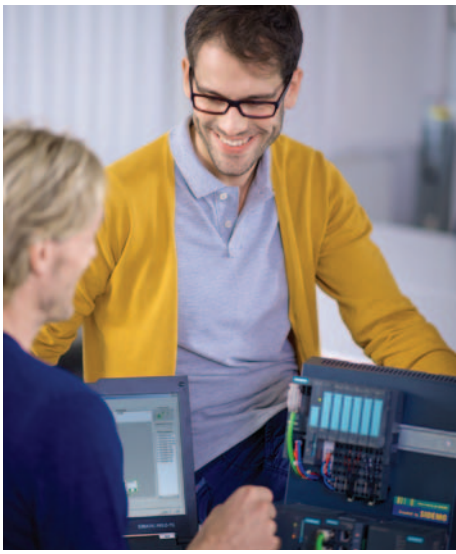

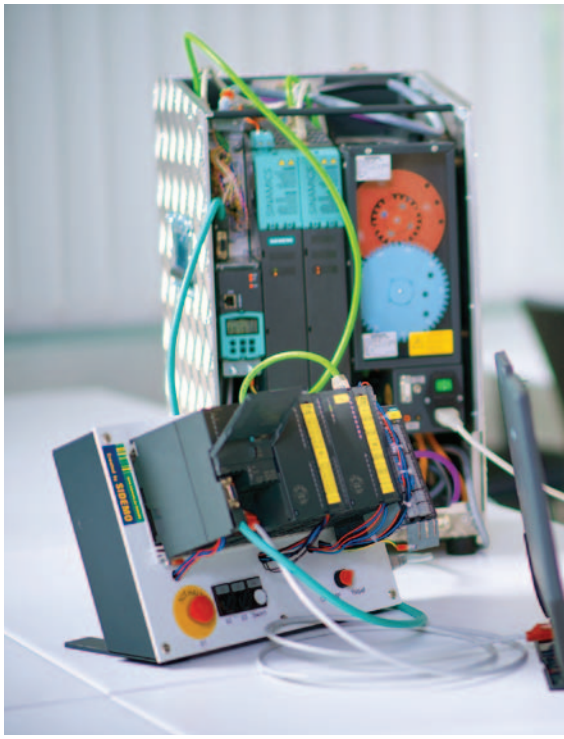

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Increased productivity

Our learning services integrate best practices and new learning technologies to deliver real business value

Siemens offers Continuing Education Credits (CEUs) for most of our courses.
For more information, please contact our SITRAIN Registrar at sitrain.registrar@siemens.com or 1-800-333-7451.

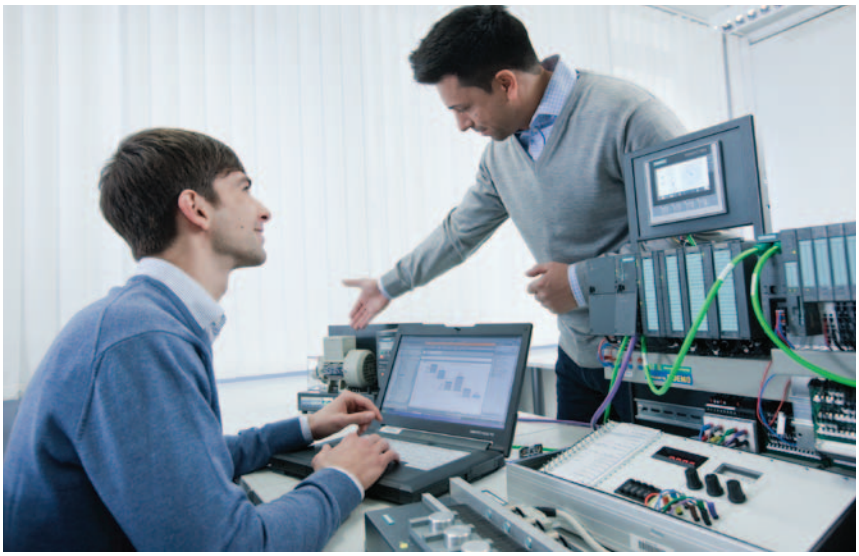
Siemens technical learning services provides students with the critical knowledge they need to know for their job directly from the equipment manufacturer. Our training solutions build the competence required to confidently make informed decisions in the daily operation of your plant's automation and drives systems. Employees will achieve increased productivity (studies say up to 230%), while staying up to date with new technologies and best practices. We understand your people, processes and technology to offer complete learning solutions and competency management programs.

Professional instructors, engineers, and highly qualified field service personnel, who have in-depth understanding of your equipment, processes and systems, conduct scheduled classes using simulation workstations at our world-class facilities, online, or on-site

Our practice-based learning approach with associated exercises makes it possible to gain theoretical knowledge reinforced with hands-on experience. Students simulate real-world situations to learn programming troubleshooting techniques that will help them commission, maintain, and operate your equipment with greater efficiency and an enhanced focus on safety.

SITRAIN curriculum families

- Automation
- Machine Tool
- Drives & Motion
- Electrical Maintenance & Safety
- Power Systems & SIMOCODE
- Process Analyzers
- Process Automation
- Process Control
- Process Instrumentation
- Industrial Networking
- Process Safety Management



Easy registration options!

Online – over 650 self-paced courses available 24/7/365. Visit usa.siemens.com/sitrain

By phone – 1-800-333-7421

Visit one of our nine regional training centers (see page vi).

The right training

Flexible course options that produce results for everyone

In today's competitive market, a highly skilled workforce is vital for success. However, understanding how to deploy an effective training strategy is a challenge. This is where Siemens can help. Rather than offering a "one-size-fits-all" solution, our SITRAIN training programs feature a variety of delivery methods designed to meet every training need.

Safety training series
Focused on protecting your people and equipment, while minimizing risk; courses address OSHA and NFPA compliance, risk assessment, arc flash, and electrical safety.

Online courses
Web-based courses delivered in a live, instructor-led training format; or self-paced learning paths for students who need the flexibility to set their own schedule and study pace for completion.

Classroom courses
Presented in a Siemens classroom with proven materials and quality systems-level work-stations for the most effective training possible.

On-site courses
Course material and learning paced to match the needs of your team; delivered at your location, saving travel and overtime costs.

Custom courses
Audience targeted training designed for special projects, applications, or groups; custom tailored to meet your time and budget constraints.

Simulator workstations
Engineered to provide real-world, hands-on experience, Siemens simulators are available in formats ranging from simple PLCSIM to fully functional motion control systems.

How-to Videos
On-demand, high-impact videos designed to retrain or refresh critical skills needed for performing specific tasks.

Certification programs
Service technician and programmer training provide specialized knowledge and skills to meet the requirements of DIN EN ISO 9001.

SITRAIN courses provide you with the flexibility to choose the style of delivery method most suited to the student's knowledge and pace of learning, as well as your budget.

The process to building expertise across a diverse workforce

SITRAIN - Training for Industry

Technical learning services line card

Workforce Performance Improvement (WPI)

Continuous Learning Program

- Well-defined, six-stage, cyclic program.
- Provides transparency into employee job skills for success.
- Improves job performance based on the business needs.

Simulated Learning

Simulator Systems

- Designed to mimic real-world environments.
- Provides a safe and risk-free platform.
- Variety of technologies and custom designed systems available.
- Hardware and software based.

Learn Here/There

Instructor-led Learning

- Hands-on learning at a customer location or Siemens training center.
- Easy enrollment online or by phone.
- Purchase per seat for Siemens training center courses or as a group for onsite courses.
- More than 180 courses.

Learn Live

Virtual Instructor-led Learning

- Students build critical skills and leverage application software in an online environment led by a Siemens instructor.
- Enroll in a single class or bundle.

Learn-as-you-Go

Self-paced Learning

- Choose from over 650 industrial control, web-based courses and complete them at your own pace.
- Purchase bundles or the entire catalog.
- Now featuring health and safety library.

Learn-as-you-Grow

On-the-Job Learning

- Create custom learning paths with our preparatory skill builders, online training, classroom training, simulators and video tools for a complete solution.

Learn Now

How-to Video Library

- On demand instruction to refresh critical topics with short (3 minutes on average) task-based videos.
- Multiple subscription options available.
- Hundreds of titles.
- Great for reinforcement and troubleshooting.

Dial-a-Mentor

Virtual Mentoring

- Expert assistance purchased in time increments.
- One-on-one activity based on desired topics of interest.

Online self-paced learning

Programs with maximum flexibility so students can easily fit courses into their busy schedules

With Siemens online self-paced learning, students select the topics and set their own pace for completing chosen courses. All course material can be accessed online. Instruction starts upon completing the purchase of a subscription.

Students can choose from over 650 courses consisting of high-quality graphics, on-screen text, supporting voice-over narration, and interactive exercises. Features include printable course content for reference and underlined key vocabulary terms with definitions displayed with a simple mouse-over action.

Depending on the subscription purchased, you can choose to provide students with access to any 10, 25, or 50 courses or select the entire online self-paced course catalog

These courses are offered 24/7/365, so students can begin their subscription at any time. From the date of registration, students are given one year to complete their course selections.

50% of the average worker's skills will be outdated in 3 to 5 years. Keep current with online learning.

To see if a self-paced online course is for you, and to find information about our online course interface system requirements, please visit: usa.siemens.com/sitrainonline

Online self-paced learning courses

- Additive Manufacturing
- Assembly-Final Stage Processes: Adhesives
- Assembly-Final Stage Processes: Coatings
- Assembly-Final Stage Processes: Fasteners
- Assembly-Final Stage Processes: Soldering
- **Automation: Siemens**
- Foundational: Inspection
- Foundational: Materials
- Foundational: Quality
- Foundational: Rigging
- Foundational: Safety
- Foundational: Shop Essentials
- Foundational: Supervisor Essentials
- Machining: Abrasives
- Machining: CNC
- Machining: Manual Machining
- Machining: Metal Cutting
- Machining: Siemens CNC
- Machining: Workholding
- Maintenance: Electrical Systems
- Maintenance: Hydraulics & Pneumatics
- Maintenance: Mechanical Systems
- Maintenance: Motor Controls
- **Maintenance: PLCs**
- Maintenance: Robotics
- **Maintenance: Siemens PLCs**
- **Maintenance: Siemens PLCs in Spanish**
- Stamping-Forming-Fabricating: Press Brake
- Stamping-Forming-Fabricating: Stamping
- Welding

Online health and safety catalog

Over 150 new course titles!

Teamed with Underwriters Laboratories (UL), Siemens Online Self-Paced learning now offers 150+ new courses focused on subjects including Crane Safety, Electrical Safety (including arc flash), Hazardous Materials, OSHA Essentials, Fire Safety, Personal Protection Equipment and many more! This addition to the SITRAIN Online-Self Paced library brings the total catalog to over 450 courses including Industrial Technologies and Health & Safety.

When discussing training plans with your customers or for your own staff training needs, consider adding a selection of SITRAIN Online Self-Paced courses. Courses can be purchased in bundles of 10, 25, 50 or unlimited access for as little as $250 per user. Online Self-paced training delivers focused, flexible learning at an exceptional value.

»Studies have shown a $4 to $6 return for every dollar invested in safety and health.«

www.osha.gov

Self-paced safety classes at sitrain-lms.com/OSPT.aspx?tab=1

- Crane Safety
- Electrical Safety & Arc Flash Arwareness
- Environmental
- Fire Safety/Combustibles
- Hazard Communication
- Hazardous Material Transportation
- Hazardous Materials
- HAZWOPER
- Health and Wellness
- Injury Prevention
- OSHA Essentials/General Safety
- Personal Protective Equipment
- Powered Industrial Trucks
- Respiratory Protection

Virtual instructor-led learning

Classroom lectures delivered in the convenience of your home or office

Siemens virtual instructor-led courses offer students a live, classroom experience with the convenience and cost savings of online learning. These courses provide hands-on instruction and live interaction, delivered anywhere an internet connection is available.

Scheduled courses are typically 10-hour agendas presented Monday through Friday, in two-hour sessions. These sessions provide students with lecture, demonstration, lab exercises, and Q&A sessions – all presented by Siemens subject matter experts. For the full course duration, students can complete assignments and reinforce classroom instruction using a virtual cloud-based application providing 24/7 access to fully functional Siemens software such as SIMATIC STEP 7 and PLCSIM.

Virtual instructor-led courses include:

- Scheduled lectures and demonstrations
- Live group and individual Q&A sessions
- 24/7 access to fully functional Siemens application software (ex., SIMATIC STEP 7)
- Working automation projects using Siemens PLCSIM simulation tools
- Lab exercises and solution reviews
- Full student and instructor desktop sharing
- Access to recorded lectures

Virtual instructor-led classes help build critical skills and knowledge and are ideal preparation for attending one of our classroom learning courses. These classes help maximize the training experience by leveraging expert instruction and access to real-world software applications.

To view all our online product offerings and schedule, please visit: usa.siemens.com/sitrainonline

- Online Self-paced technology and safety library
- Virtual Instructor-led courses build foundation knowledge with flexibility
- How-to Video Library offers task based 1-5 minute videos

Visit **usa.siemens.com/sitrainonline** to view all Virtual Instructor-led training

Classroom learning

Expert and professional instructors, proven course-ware and quality workstations combine for the most effective classroom experience possible

Using a blended approach to learning, our classroom courses include instructor-led lectures along with hands-on learning using our custom-designed simulator training devices.

Studies indicate that when students practice what they have learned in a classroom setting they will retain 75% of the lesson, as compared with lecture-only settings where they retain just 20% of the lesson. Designed to mimic real-world environments, Siemens simulator workstations provide a safe and risk-free platform for job training, project testing, design engineering, and troubleshooting.

Our learning content is reviewed and approved by Siemens technical and operational experts to ensure compliance with the highest industry, health, safety, and environmental standards.

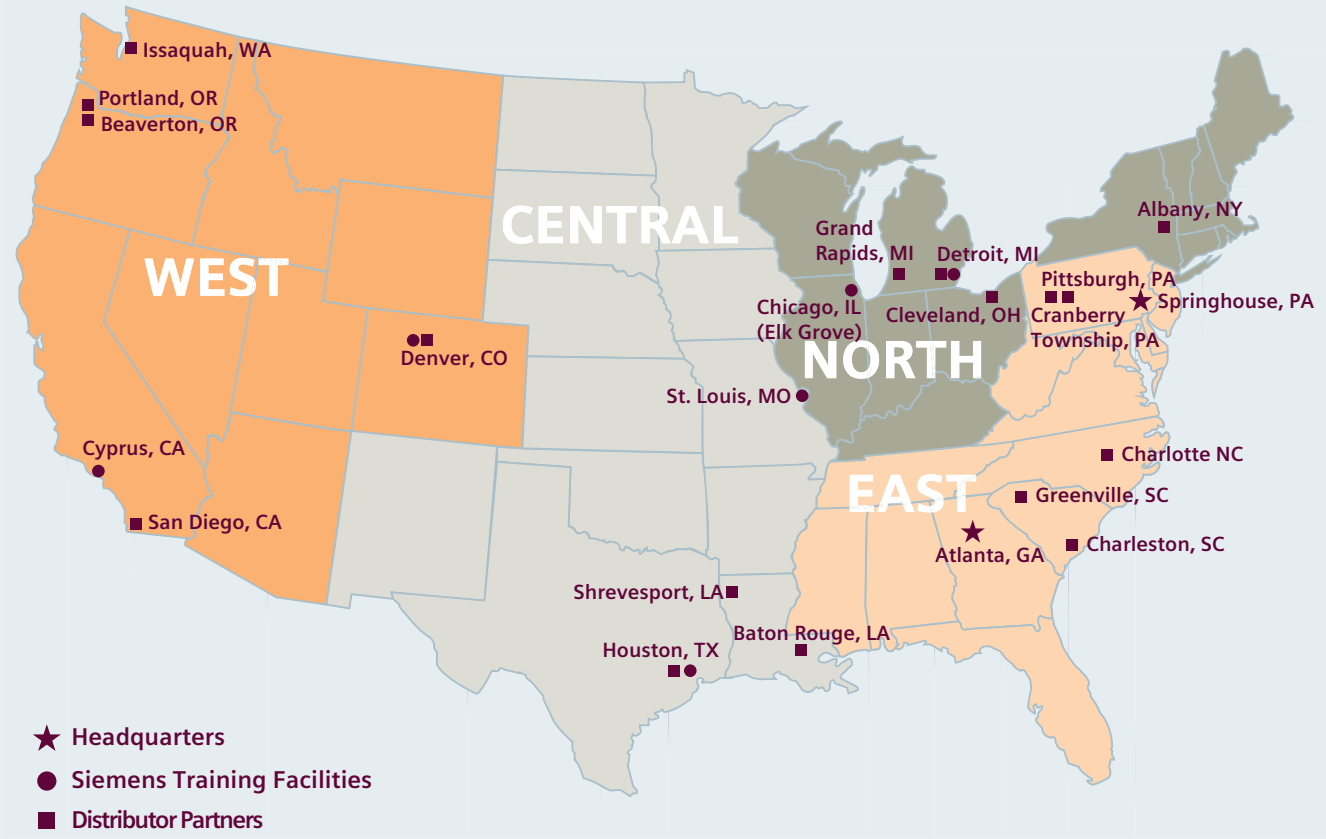
We combine technology and industry experience to deliver a highly effective, customized learning programs

- Job targeted courses
- Hands-on learning and skill building
- System-level training approach
- Extensive schedule of classes
- Various media and course length options
- On-site and custom courses
- Multiple training center locations
- Packaged services and products

SITRAIN learning programs provide your employees with the opportunity to achieve personal goals, while at the same time, positively impacting your operating and financial goals. Benefits include:

- Increased productivity and efficiency
- Reduced employee turnover
- Decreased downtime and faster error resolution
- Improved safety and risk management
- Flexibility to adopt new technologies/methods
- Enhanced company image and talent recruiting

Build a more efficient, effective, and highly motivated team – with Siemens classroom learning



Siemens U.S.-based training is offered at our headquarters in Atlanta, Georgia, as well as regional locations across the country. Each facility provides students with access to a full-time instructor and offers an advanced learning environment featuring our training simulator systems.

There are four business development regions in the USA.

West Region
Contact TJ Terrell
770-653-9612
tyran.terrell_jr@siemens.com

Central Region
Contact Nolan Grice
281-710-2843
nolan.grice@siemens.com

North Region
Contact Richard Rosenfield
404-353-3824
richard.rosenfield@siemens.com

East Region
Contact Rob Carper
404-754-6101
robert.carper@siemens.com

How-to video library

Quick, affordable, task-based learning options for a broad range of automation topics

This extensive library of short videos was created by our instructional experts to meet the real-world needs of industry, with all levels of experience in mind. By providing on-demand, how-to instruction in easy-to-understand bites, the How-to Video Library helps maintain the critical industrial and manufacturing knowledge and skills developed during instructor-led training courses. Videos are typically three-minutes long and conveniently available via any computer or mobile device with Internet access.

»More than 40% of mostly small and medium-size companies report difficulty finding skilled craftsmen to replace those retiring or leaving the industry. "It's what worries these CEOs most about their futures.«

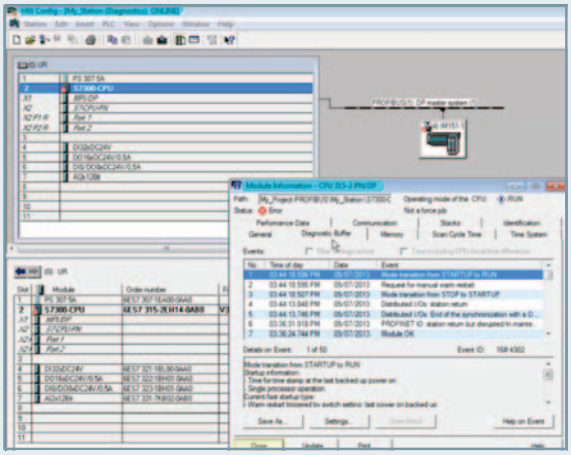
Barry Bluestone,
the Northeastern University

Learning begins once you've completed registration

- Start your subscription at any time – videos are available 24/7/365
- Purchase one, three, six or 12 month subscriptions by technology or in one complete bundle
- Take advantage of our most-flexible option – ultimate access with a full, one-year subscription

Want to learn more?

Browse our complete library of How-to Video Library at:
usa.siemens.com/sitrainonline



How-to Videos

- Automation - SIMATIC S7 with STEP 7 v5.5
- Automation - SIMATIC S& with TIA Portal
- CNC - SINUMERIK Power Line
- Drives - Low Voltage
- Process Control – PCS7
- Even more technology categories are being added this year!

Simulators

World-class simulation systems available for training or purchase

Engineered to provide a real-world experience, Siemens simulators are fully functional, ready-to-use systems available in formats ranging from simple PLCSIM to fully integrated motion control systems. System-level design makes the simulators an invaluable tool for program testing and debugging, reinforcing learning, shop floor troubleshooting, and more. With portable construction and hard-shell cases, they can be easily transported. Custom-built systems are also available.

SIMATIC S7-300 HMI / Net

SIMATIC PCS7 System

SINUMERIK 840Dsl

SIMATIC S7-1500

SINAMICS G120 / S120

SINAMICS DCM

SIMATIC S7-1200

SIMOTION D435

SINAMICS Safety

Workforce Performance Improvement

Siemens training solutions will help you get your workforce up to speed and stay current.

A recent report from Deloitte and the Manufacturing Institute (MI) projects more than three million U.S. manufacturing jobs will open up over the next decade. Two million of those vacancies are expected to go unfilled.

Experts have warned for years about the manufacturing workforce reality created by retiring baby boomers taking decades of knowledge with them as they leave. While candidates are lining up for these jobs, many do not yet have the digital skills required for the changing workplace creating a manufacturing skills gap challenge.

The solution to bridging the skills gap is to improve performance by identifying and increasing the related competencies for the specific job/role, thereby increasing job performance as well as overall organizational performance.

Workforce Performance Improvement

Siemens Workforce Performance Improvement program is a well-defined, six-stage cyclic program providing transparency into employee job skills for success. Our program begins by aligning current worker competency to business targets.

Each of the six stages have been carefully designed with the end in mind. The improvement process begins by identifying your key performance indicators (KPI) related to workforce learning.

As part of the process, employees are evaluated and set on purposeful and sustainable performance-based skill development paths – paths which result in a highly skilled, confident and motivated workforce. This, in turn, results in less downtime, reduced turnover and, ultimately, an improved bottom line for your operation.

Siemens approaches the learning process from your business perspective. We have a common goal: improving job performance based on your business needs.

Program elements for Workforce Performance Improvement

Building applicable, practical know-how

Siemens Cooperates with Education – support for schools interested in engaging with leading edge industrial technologies.

Through the Siemens Cooperates with Education (SCE) initiative, universities, K-12 schools, and community colleges are afforded the opportunity to partner with Siemens on leading edge industrial technologies in their classrooms, research projects and workforce development programs. We provide support through equipment, software, instructor training and technical guidance.

SCE program offers curriculums and automation training based on Massive Open Online Course (MOOC) and blended learning concepts for conveying know-how on Industry 4.0. Educational institutions benefit from special conditions, support and partnerships.

For more information, see Siemens Cooperates with Education usa.siemens.com/sce

Cooperates with Education

Automation

SIEMENS

Curriculum	Workshops & Classes	Trainer Packages	Learning Systems	Promoters
Course material and instructional tools	Know-how transfer. Products, innovations and solutions.	Leading technologies, with deep discounts for schools.	Professional systems offered by our Didatic Partners.	Face-to-face support worldwide—in many regions.

»By teaching Siemens, our students are much more attractive in the job market. Companies come from far away to recruit at our school (a small rural community college). We now have a German company recruiting students to take to Germany and train there for 2 years and then come back to work in the US for them.«

Accounties Smith,
Tri-County Technical College

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Key to graphic symbols

Length of course in days

Length of course in hours

Click to register online

Click for more information

Foundational or prerequisite course offering

Automation – S7-300 / S7-400 / STEP 7 V5.X

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from the Online Self-paced Training *Automation: Siemens* and *Maintenance: Siemens PLCs* categories. An arrow indicates a prerequisite for the next course.

Maintenance

Introduction to PLCs and Languages (Virtual Instructor-led) — 20 HOURS
SCT-S7OILPLCI1B

S7 Automation Maintenance 1 — 4.5 DAYS
SCT-S7300S1C

↓

S7 Automation Maintenance 2 — 4.5 DAYS
SCT-S7300S2C

Engineering Core

Introduction to PLCs and Languages (Virtual Instructor-led) — 20 HOURS
SCT-S7OILPLCI1B

S7 Programming 1 — 4.5 DAYS
SCT-S7TIAP1B

S7 Programming with SCL (Virtual Instructor-led) — 20 HOURS
SCT-S7OILSCLP1A

S7 Programming 1, Refreshers (Virtual Instructor-led) — 2 HOURS EA.
SCT-S7TIAP1B-RA1, RA2, & RA3

S7 Programming 2 — 4.5 DAYS
SCT-S7TIAP2B

↓

S7 Programming 3 — 4.5 DAYS
SCT-S7TIAP3B

Certification

Siemens Certified Programmer Refresher — 4.5 DAYS
SCT-S7TIAR3A

Siemens Certified Programmer – Test — 1 DAY
SCT-S7TIAC3A

Engineering Advanced

S7-400H Redundant System Sustaining — 3 DAYS
SCT-S74HRS1A

S7 Programming with STL — 3 DAYS
SCT-S7STLP2A

AB to S7 Migration Engineering — 4.5 DAYS
SCT-S7AB7P1A

S7-300F Distributed Safety Sustaining — 2 DAYS
SCT-S7SFTS1A

S7-300F Distributed Safety Engineering — 2.5 DAYS
SCT-S7SFTE1A

S7 Programming with S7 Graph — 2 DAYS
SCT-S7GPHP1A

S7 Programming with SCL — 3.5 DAYS
SCT-S7SCLP1A

Same course onsite above OR online below

STEP 7 v5 Programming with SCL (Virtual Instructor-led) — 10 HOURS
SCT-S7OILSCLP1A

VIDEO

How to Video Library
Automation - SIMATIC S7 with STEP 7 v5.5 over 350 titles

Automation – SIMATIC S7 with STEP 7 v5

AB to S7 Fast Track

Course code: **SCT-S7ABFP1A**

Target audience
Experienced AB programmers interested in an advanced familiarization with Siemens SIMATIC S7 PLC family and STEP 7 engineering software.

Prerequisites
- Allen Bradley PLC Programming skills.

Course Profile
This course is a "Fast-Track" agenda acknowledging the automation experience of the students and, delivers must-know, advanced topics to highly experienced engineers interested in SIMATIC STEP 7. This course moves engineers/programmers quickly into the power of STEP 7. Multiple S7 program editors are presented demonstrating the flexibility and fully integrated features of STEP 7.

This course concentrates on STEP 7 software, program structures, System Functions, advanced block libraries and custom block design. STEP 7 engineering tools and programming instructions are demonstrated to guide the student through the development of a realistic applications. Analog processing and alarming are detailed through theory and program examples.

Objectives
Upon completion of this course, the student shall be able to:
- Utilize STEP 7 engineering tools.
- Program using the multiple address types.
- Use symbolic addressing.
- Test and troubleshoot an application program.
- Create custom code blocks.
- Create reusable program blocks.
- Use data access functions.
- Program to process analog values.
- Monitor data blocks.

Topics
- SIMATIC S7 verses AB Overview
- Memory Allocation and Symbolic Addressing
- Hardware Assignments
- Program Editors / Instruction Set
- Debug, Test and Documentation

Automation – SIMATIC S7 with STEP 7 v5

AB to S7 Migration Engineering

Course code: **SCT-S7AB7P1A**

Target audience
This course is for experienced AB engineers and maintenance staff who are migrating systems to Siemens SIMATIC S7 PLC family and STEP 7 engineering software.

Prerequisites
- Users should have Allen-Bradley PLC5 with RSLinx or RSLogix expertise.

Course Profile
This course agenda acknowledges the automation experience of the students and delivers must-know information for systems migration to S7. Taught by an applications engineer experienced with A-B products, software and applications, this course moves engineers or high level maintenance staff quickly into the power of STEP 7. A variety of real world solutions and key AB functionality is compared, contrasted and demonstrated in this course. Multiple S7 program editors are presented demonstrating the flexibility and fully integrated features of STEP 7.

Objectives
Upon completion of this course, the student shall be able to:
- Use the engineering tools of STEP 7
- Program using the multiple address types.
- Use symbolic addressing.
- Create, document, test and troubleshoot
- an application program.
- Create custom code blocks
- Structure a program that can use a program block multiple times.
- Use the data access functions.
- Program using the processed analog values.
- Generate data blocks.

Topics
- SIMATIC S7 verses AB Overview
- Memory Allocation and Symbolic Addressing
- Hardware Assignments
- Structured Programming
- Timers and Counters
- Analog Handling
- PID Loops and Advanced Instructions
- Debug, Test and Documentation
- Project Integration

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming 1

Course code: **SCT-S7TIAP1B**

Target audience
This course is for SIMATIC S7-300/400 PLC users who are involved with developing or sustaining automation systems and their application programs.

Prerequisites
- MS Windows Expertise.

Course Profile
This course is the first in a three part series which builds basic programming skills with Siemens STEP 7 software. Students will learn S7 project management, program design and application development. This is an aggressively paced curriculum covering the S7 programming editor with Ladder, Function Block Diagram, and Statement List programming languages, and key software tools. This course takes a systems approach to the S7-300/400 PLCs, plus basic connectivity and functionality of an HMI and PROFIBUS remote I/O.

Objectives
Upon completion of this course, the student shall be able to:
- Complete a system hardware configuration.
- Build, document, test and troubleshoot a structured STEP 7 program.
- Program using the multiple address types.
- Use symbolic addressing.
- Use core application instructions, functions and blocks.
- Program using the processed analog values.
- Generate data blocks.
- Establish connections to an HMI system.

Topics
- STEP 7 Family Overview
- Introduction to SIMATIC Manager
- Hardware Configuration Tool
- Monitor/Modify Tool
- Programming with STEP 7
- Assigning symbol names to Objects
- HMI for process control
- Software catalog elements
- System diagnostics
- Analog value processing
- Backing up the project

Automation – S7-300 / S7-400 / STEP 7 V5.X

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming 2

Course code: **SCT-S7TIAP2B**

Target audience
This course is for SIMATIC S7-300/400 PLC users with basic engineering experience in the design and sustaining of SIMATIC automation systems and their application programs.

Prerequisites
- S7 TIA Programming 1

Course Profile
This course is the second in a three part series which increases skills with Siemens STEP 7 Totally Integrated Automation. Students will learn to leverage the power of SIMATIC software with advanced structured programming techniques.
A systems approach to the integration of efficiently programming the S7-300/400 PLCs, plus connectivity and functionality of an HMI and Micro Master Drive are the central focus of this course. Emphasis on Statement List (STL) programming for both direct and indirect addressing is an integral part of the course.

Objectives
Upon completion of this course, the student shall be able to:
- Leverage the power of Block and Function libraries.
- Use STL for advanced program development.
- Employ indirect addressing in a program.
- Incorporate System Functions (SFC) in a program.
- Integrate an HMI and Drive system with the PLC.
- Use Instance and Multi-Instance data Blocks.
- Use interrupt-driven and error processing program execution blocks.
- Leverage STEP 7 advanced diagnostics.

Topics
- Programming review
- Data Blocks and complex variables
- HMI event and alarm messages
- Introduction to Micro Master 4 Drives
- Program control
- Organization Blocks
- Parameter Passing with FC, FB, SFB, SFC
- Indirect Addressing
- Troubleshooting the automation system

4.5 Days | Register here | More information

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming 3

Course code: **SCT-S7TIAP3B**

Target audience
This course is for advanced SIMATIC S7-300/400 users who are involved with developing or maintaining automation systems and their control applications.

Prerequisites
- S7 TIA Programming 2

Course Profile
This course builds advanced skills in control system programming in a control systems environment. Workstations will include the S7 PLC, Touch Panel HMI, Drive system and both PROFIBUS and Ethernet networks. Students will be challenged with a number of advanced programming techniques including data management routines, advanced system functions, new program efficiency tools and error handling. Advanced level blocks, functions, tools and libraries are discussed and demonstrated.

Objectives
Upon completion of this course, the student shall be able to:
- Efficiently apply Data Blocks.
- Efficiently use the various Data Types.
- Manage program errors.
- Build and manage Recipes.
- Understand the advantages of each networking type.
- Set up a basic Ethernet network.
- Understand the optional program editors and their advantages.

Topics
- Training Units and Addressing
- Block calls and Multi Instance Model
- Complex Data Type Applications
- Indirect Addressing & Registers
- Block Calls & Parameters
- Error Handling
- Recipes
- S7 Communications
- S7 Ethernet
- S7 Engineering Tools Overview

4.5 Days | Register here | More information

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming with S7 Graph

Course code: **SCT-S7GPHP1A**

Target audience
This course is for SIMATIC S7-300/400 PLC users involved in developing or sustaining automation systems that use of S7Graph.

Prerequisites
- S7 TIA Programming 1

Objectives
Upon completion of this course, the student shall be able to:
- Structure and process a program using the program elements of S7 GRAPH
- Create, document, test and troubleshoot an application program.
- Identify the components and performance characteristics of an S7 GRAPH structure.
- Structure and process a program using the program elements of S7 GRAPH
- Create, document, test and troubleshoot an application program.

Topics
- S7 GRAPH Programming Elements
  - S7 GRAPH Block
  - Program Editor Screen
  - Using the Help and Tutorial files
  - Using the Menus and Toolbars
  - S7 GRAPH Property Settings
- Principles of S7 GRAPH Programming
  - Calling the Graph Program
  - Monitoring the operation of a Sequencer
  - Program execution and scan
  - Running an Example Program
- S7 GRAPH Program Structures
  - Alternative and Simultaneous Branching
  - Terminations and Jumps
  - Interlocks and Supervisions
  - Event Dependent Actions
  - Permanent Operations
- Interaction with Other Program Modules
  - Operating Modes
  - Handling System Faults
  - Initializing the Sequencer
  - Manual control of the Sequencer
- Documentations and Storage
  - Documenting program blocks and networks
  - Creating cross-reference lists
  - Printing programs with documentation
  - Archiving projects and programs
  - Symbolic programming

2 Days | Register here | More information

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming with SCL

Course code: **SCT-S7SCLP1A**

Target audience
This course is for engineering and maintenance personnel, who create, diagnose and troubleshoot SIMATIC STEP 7 applications with Structured Control Language (SCL) content.

Prerequisites
- S7 TIA Programming 1

Course Profile
This course provides an in depth look at STEP 7 programming and program troubleshooting with a focus on the Structured Control Language (SCL) – a PASCAL-similar high level text language for programming mathematical algorithms, data management and organization tasks for Siemens automation systems.

Students should have a solid working knowledge of STEP 7, SIMATIC Manager and the basic diagnostics and editor tools. This is a hands-on course filled with programming exercises in SCL. Students will use advanced software tools of STEP 7 including PLCSIM to complete system integration programming, troubleshooting, and functional testing of applications.

Objectives
Upon completion of this course, the student shall be able to:
- Efficiently use the SIMATIC Manager program editor tools.
- Use the STEP 7 program monitor, diagnostics and troubleshooting tools.
- Build or modify SCL programs.
- Package an SCL program into a custom library block and use within a STEP 7 project.
- Explore the SCL syntax requirements and the system debug functions.
- Use PLCSIM to software

Topics
- The SIMATIC Manager
- SCL Overview, Program Structure and Syntax
- SCL Data Types and Declarations
- SCL Control Instructions

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming with STL

Course code: **SCT-S7STLP2A**

Target audience
This course is intended for SIMATIC S7-300/400 PLC users with basic engineering experience in designing and sustaining SIMATIC automation systems and associated application programs.

Prerequisites
- S7 TIA Programming 2

Course Profile
The Advanced Statement List course is designed to provide participants with STL programming skills using hands-on tasks. These tasks increase Siemens STEP 7 Totally Integrated Automation (TIA) skills through
the creation of a Siemens TIA project.

The central focus of this course is through a systems integration approach – from efficiently programming S7-300/400 PLCs using Statement List (STL) programming to connecting to an HMI and MICROMASTER drive. Students will gain knowledge in advanced Statement List (STL) instructions and instantiation.

A majority of this course is hands-on, practical exercises with approximately 10% theory. The goals are to aggressively guide the participant through a basic system project design, creation, and implementation.

Objectives
Upon completion of this course, the student shall be able to:
- Apply concepts of structured program creation.
- Use and create Block and Function libraries.
- Use STL for advanced program development.
- Employ indirect addressing in a program.

Topics
- Hardware review and configuration setup
- Key Topics from S7 TIA Programming
- Data Blocks and complex variables
- HMI integration
- Introduction to MICROMASTER 4x drives
- Organization Blocks
- Parameter passing with FC, FB, SFB, SFC
- Indirect Addressing
- Troubleshooting the automation system

Automation – SIMATIC S7 with STEP 7 v5

S7 Automation Maintenance 1

Course code: **SCT-S7300S1C**

Target audience
This course is the first of a two part series designed for maintainers and "first responders" to Siemens S7 automated control systems. Maintenance technicians, electricians, supervisors and others, who need to develop active skills using their Siemens Hardware system, should attend this course to maximize line uptime. This course also provides a great platform for those new to automation systems and state-of-the-art industrial electronics.

Prerequisites
- MS Windows Expertise
- SUGGESTED PREREQUISITE: Introduction to PLCs and Languages - Virtual Instructor-led course (S7OILPLCI1B).

Course Profile
This course is designed with brief instructor led discussions followed by numerous hands-on exercises using a Totally Integrated Automation (TIA) plant model develop and reinforce practical experience. The TIA plant model consists of an S7-300 automation system, ET200S distributed I/O station, SIMATIC HMI Touch Panel, and a working conveyor model. Students perform visual and multi-meter wire checks, hardware component diagnostics and troubleshooting as well as equipment replacement and restoring a failed PLC system to a normal operating state. Upon completion of the course, maintenance technicians should be able to establish communications to a Siemens PLC system, diagnose, troubleshoot, and restore basic faults on an S7 hardware system, reducing costly downtimes.

Topics
- PLC Hardware, Cabling and Configuration
- STEP 7 and the SIMATIC Manager
- The STEP 7 Program Editor
- Binary and Digital Operations

– S7-300 / S7-400 / STEP 7 V5.X

Automation – SIMATIC S7 with STEP 7 v5

S7 Automation Maintenance 2

Course code: **SCT-S7300S2C**

Target audience
This course is the second of a two part series designed for maintainers of and "first responders" to Siemens S7 automated control systems. Maintenance technicians, electricians, supervisors and others, who need to develop active skills using their Siemens hardware system, should attend this course to maximize process uptime.
This course also provides a great platform for those new to automation systems and state-of-the-art industrial electronics.

Prerequisites
- S7 Automation Maintenance 1.

Course Profile
Automation Maintenance 2 is a course designed with brief instructor led discussions followed by numerous hands-on exercises using a Totally Integrated Automation (TIA) plant model to develop and reinforce practical experience. The TIA plant model consists of an S7-300 automation system, ET200S and ET200pro distributed I/O stations, SIMATIC HMI Touch Panel, and a working conveyor model, all communicating over PROFINET.
Students perform hardware and software diagnostics and troubleshooting as well as restoring a faulted PLC system to a normal operating state.

Topics
- Commission the Hardware Station over PROFINET
- Commission the HMI over PROFINET
- How to set up the CPU's Report System Error (RSE) function
- Hardware Troubleshooting and Diagnostics
- Monitor conveyor system functionality
- Absolute addressing & Symbolic addressing
- Managing symbol names in
- Data Blocks (DB)
- Monitoring, debugging Math/Comparison Logic Timers and Counters
- ET200Pro I/O station
- Basic Software Troubleshooting skills and debugging of simple code functional errors
- Analog
- Intro to Function Block Diagram (FBD)
- Statement List (STL) instructions
- Reusable Blocks

Automation – SIMATIC S7 with STEP 7 v5

S7-300F Distributed Safety Engineering

Course code: **SCT-S7SFTE1A**

Target audience
This course is for engineers and personnel responsible for implementing SIMATIC Distributed Safety systems, including:
- Selecting the appropriate architecture
- Selecting the components and understanding their specific purposes and limitations
- Specifying the module and system wiring
- Developing the safety PLC program
- Starting up and supporting the system.

Prerequisites
- MS Windows Expertise
- AB-S7 Fastrack OR S7 Automation Maintenance 1 OR S7 TIA Programming 1

Course Profile
This course introduces the student to a Siemens Distributed Safety PLC application. Participants receive knowledge on applying the system per relevant standards, Failsafe Hardware Module details and parameterization, Safety Program structure and implementation, Safety Communications, System Diagnostics and introduction to Drive Safety.

Objectives
Upon completion of this course, the student shall be able to:
- Locate and understand the applicability of the detailed documentation and development resources
- Select and configure the Failsafe Hardware components, and understand their application restrictions.
- Properly implement a Safety program in the PLC.
- Document, test, and troubleshoot the system.

Topics
- Introduction to Distributed Safety
- Standards discussion
- Hardware introduction and safety wiring
- STEP 7 quick tour
- STEP 7 Distributed Safety overview and labs
- Reintegration
- Safety Logic
- System Communication overview
- Diagnostics
- Throughput Calculations

Automation – SIMATIC S7 with STEP 7 v5

S7-300F Distributed Safety Sustaining

Course code: **SCT-S7SFTS1A**

Target audience
This course is for SIMATIC S7 300F PLC users who install or maintain automation safety systems and their application programs.

Prerequisites
- S7 Automation Maintenance 1 OR S7 TIA Programming 1

Course Profile
This course introduces the student to a Siemens Distributed Safety PLC application. Participants will build skills on commissioning, troubleshooting and upgrading an automation safety system. Failsafe Hardware Module details and parameterization, Safety Program structure and implementation, and System Diagnostics are covered.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concept of the Siemens S7 safety integrated system.
- Identify S7 safety components.
- Know how to remove and replace S7-300 and ET200S safety components.
- Identify the wiring diagrams of the S7-300 and ET200S safety components.
- Identify the LED diagnostics
- Identify the addressing of the S7-300 safety components
- Understand the structure of an S7-300 safety program.
- Troubleshoot using the Hardware Configuration diagnostics to identify system faults.
- Troubleshooting using the VAT to monitor the I/O modules' diagnostic bits.
- Troubleshooting using the status of program logic

Topics
- Safety Systems Overview
- Introduction to Standard & Safety Block Structure
- Safety Products
- S7 Safety CPU and ET200S Hardware
- Safety PLC Hardware Configuration
- Safety Program Code
- Testing and Diagnostics

Automation – SIMATIC S7 with STEP 7 v5

S7-400H Redundant System Sustaining

Course code: **SCT-S74HRS1A**

Target audience
The target audiences for this course are service personnel, plant engineers, maintenance technicians and users responsible for sustaining, maintaining, optimizing and troubleshooting an S7-400H Redundant System.

Prerequisites
- S7 Automation Maintenance 1

Course Profile
This course builds skills for sustaining and maintaining a Siemens S7-400H Redundant System. The course begins with an introduction to redundant automation system concepts, purpose and typical system architectures. The course then builds skills in hardware components, SIMATIC redundant project management and, specific hardware tools application.

Objectives
Upon completion of this course, the student shall be able to:
- Configure and parameterize S7-400H Redundant system Hardware
- Perform startup procedures for S7-400H
- Perform Configuration-in-Run (CiR) Replacement of Hardware
- Maintain components of an S7-400H Redundant System.
- Assemble redundant system hardware, cabling, wiring and, perform testing procedures.
- Establish redundant system communication
- Use standard STEP 7 tools and methods for testing and diagnosing hardware & software problems in a running redundant system.
- Address and wire ET200M remote I/O
- Configure and parameterize PROFIBUS DP and Y-link components.

Topics
- Configure S7400H Redundant System Hardware
- S7-400 Hardware Commissioning
- Redundant System Remote I/O
- Commission Remote I/O
- Configuration-in-Run Mode (CiR)
- Redundant System Troubleshooting Techniques

Automation – SIMATIC S7 with STEP 7 v5

Siemens Certified Programmer Refresher

Course code: **SCT- S7TIAR3A**

Target audience
This course is intended for experienced STEP 7 programmers seeking a Siemens Certification which is recognized globally. This refresher course will help prepare the participant for the Siemens Certified Programmer Certification Test.

Prerequisites
- S7 TIA Programming 1
- S7 TIA Programming 2
- S7 TIA Programming 3

Course Profile
This is a hands-on, instructor led course provides a focused review and skills refresher of topics taught in TIA Programming 1, 2, and 3 courses. This refresher is intended to prepare the student for the Siemens Certified Programmer Test (course code SCT-S7TIAC3A) held at the conclusion of the course.

Objectives
Upon completion of this course, the student shall be able to:
Successfully Complete the Siemens Certified Service Programmer Test.

Topics
- Course Overview
- Hardware
- Tag (Symbol) Table
- Program principles
- Troubleshooting Program errors
- HMI
- MICROMASTER Drive
- Independent Project

Automation – SIMATIC S7 with STEP 7 v5

Siemens Certified Programmer – Test

Course code: **SCT-S7TIAC3A**

Target audience
This Siemens Programmer Certification Test is intended for experienced STEP 7 programmers who have met the prerequisites below.

Prerequisites
- Advanced Programming Experience
- S7 TIA Programming 1
- S7 TIA Programming 2
- S7 TIA Programming 3

Course Profile
This is a comprehensive performance test designed to assess the skills of a PLC programmer applicant for Siemens PLC systems. This is a practical, skills-based certification test covering topics taught during TIA Programming 1, 2, and 3. It is recommended that the student attend the "Siemens Certified Programmer Refresher" in preparation for the test (course code SCT-S7TIAR3A).

Topics
- Skills and abilities of a Siemens Certified Programmer
  - Parameterization of the CPU
  - Configuration of the distributed I/O
  - Configuration of a drive
  - Programming of an HMI device
  - Structuring of a program using a structogram
  - Implementation of the program taking account of the aspect of reusability through the use of:
    - Functions, function blocks and multi-instances
    - Complex data structures
    - Library functions for integrated error handling
- Passing the test entitles the participant to be awarded "Siemens Certified Programmer" status recognized globally by Siemens, distributors, partners and other companies.
- At minimum, prerequisites must be met in order to take the test.
- Taking the recommended Siemens "Certified Programmer Refresher" provides a quality hands-on review of all needed skills prior to taking the certification test. The test is included as part of the review course.

Automation – S7-300 / S7-400 / STEP 7 V5.X

Automation – Virtual Instructor Led

Introduction to SIMATIC PLCs and Languages

Course code: **SCT-S7OILPLCP1B**

Target audience
This course is for engineers and maintenance personnel who are new to PLC programming — who will be creating, modifying or trouble-shooting S7 PLC systems with SIMATIC STEP 7 software.

Course Profile
This course is designed to provide the student with core SIMATIC PLC program fundamentals. For learners new to PLC applications, this course is an ideal preparation to the S7 Programming 1 or S7 Automation Maintenance 1 courses. Whether designing a PLC program or troubleshooting a control system, this course builds fundamental skills and confidence in key concepts, navigation, tools and procedures for a successful continuous learning path.

Students needing a solid introduction to the core PLC programming languages will find this a great fit. Three program editors, LAD, FBD and STL are introduced with the primary development and troubleshooting tools. Basic logic development and data memory management complete the curriculum and help the student build skills in PLC program basics.

This is a live, virtual instructor led course delivered in 2-hour learning modules through an innovative web application. Access to fully functional STEP 7 software will be provided through a cloud based application. Learners are encouraged to complete assigned lab exercises during and after each session to reinforce the learning modules throughout the week. Professional Siemens instructors are available to answer student questions outside of scheduled class times..

Topics
- Number Systems & IEC61131 Standard
- SIMATIC Development Tools
- PLC Inputs and Outputs
- PLC I/O Addressing
- Ladder Logic & FBD Instructions

Virtual and Classroom Instructor-led

STEP 7 v5 Programming with SCL

Course code: **SCT-S7OILSCLP1A or SCT-S7SCLP1A**

Target audience
This course is for engineering and maintenance personnel, who create, diagnose and troubleshoot SIMATIC STEP 7 applications with Structured Control Language (SCL) content.

Prerequisites
- S7 Programming 1

Course Profile
This course provides an in depth look at STEP 7 programming and program troubleshooting with a focus on the Structured Control Language (SCL) – a PASCALsimilar high level text language for programming mathematical algorithms, data management and organization tasks for Siemens automation systems.

Students should have a solid working knowledge of STEP 7, SIMATIC Manager and the basic diagnostics and editor tools. This is a hands-on course filled with programming exercises in SCL. Students will use advanced software tools of STEP 7 including PLCSIM to complete system integration programming, troubleshooting, and functional testing of applications.

Objectives
Upon completion of this course, the student shall be able to:
- Efficiently use the SIMATIC Manager program editor tools.
- Use the STEP 7 program monitor, diagnostics and troubleshooting tools.
- Build and modify SCL programs.
- Package an SCL program into a custom library block and use within a STEP 7 project.
- Explore the SCL syntax requirements and the system debug functions.
- Use PLCSIM software to simulate PLC hardware and test user defined SCL program code.

Topics
- The SIMATIC Manager
- SCL Overview
- SCL Program Structure
- SCL Syntax
- SCL Data Types
- SCL Declarations
- SCL Control Instructions

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Automation – TIA Portal S7-1200 / S7-300 / S7-1500

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from the Online Self-paced Training *Automation: Siemens* and *Maintenance: Siemens PLCs* categories. An arrow indicates a prerequisite for the next course.

Maintenance

Introduction to TIA Portal (Virtual Instructor-led) — 10 HOURS
SCT-PTOILPLCI1A

TIA Portal Service 1 — 4.5 DAYS
SCT-PTTIAS1A

TIA Portal Service 2 — 4.5 DAYS
SCT-PTTIAS2A

Engineering Core

Introduction to TIA Portal (Virtual Instructor-led) — 10 HOURS
SCT-PTOILPLCI1A

TIA Portal Programming 1 — 4.5 DAYS
SCT-PTTIAP1A

TIA Portal Programming 2 — 4.5 DAYS
SCT-PTTIAP2A

TIA Portal Programming 3 — 4.5 DAYS
SCT-PTTIAP3A

S7-1200 Maintenance & Engineering

S7-1200 TIA System — 4.5 DAYS
SCT-S712TP1A

Human Machine Interface Maintenance & Engineering

TIA Portal WinCC Comfort / Advanced Configuration — 3 DAYS
SCT-PTWCSU2A

TIA Portal WinCC Professional (SCADA) Configuration — 4.5 DAYS
SCT-PTWCSP1A

Advanced & Optional Courses

S7 TIA Portal Programming with SCL (Virtual Instructor-led) — 10 HOURS
SCT-PTOILSCLP3A

TIA Portal with SCL Programming — 3.5 DAYS
SCT-PTOILSCLP3A

TIA Portal Safety Engineering — 3 DAYS
SCT-PTSFTE1A

AB to S7 with TIA Portal — 4.5 DAYS
SCT-PTABFP1B

VIDEO

How-to Video Library
Automation - SIMATIC S7 with TIA Portal

Automation – SIMATIC S7 with TIA Portal

AB to S7 with TIA Portal

Course code: **SCT-PTABFP1B**

Course Profile
This course concentrates on STEP 7 software, program structures, System Functions, advanced block libraries and custom block design. STEP 7 engineering tools and programming instructions are demonstrated to guide the student through the development of a realistic application. The course format consists of instruction, demonstration, and hands-on exercises. Students utilize test, debug and diagnostic tools to complete extensive programming exercises.

Objectives
Upon completion of this course, the student shall be able to:
- Utilize STEP 7 TIA Portal engineering tools
- Insert an HMI device into a project
- Locate Tags using Cross-Reference tool
- Utilize System Diagnostic Functions to test and troubleshoot an application program.
- Create custom code blocks
- Create reusable program code (FB, DB, FC, etc.) and insert in Library
- Assign tags in STEP 7 TIA Portal
- Create, Store, and Retrieve Library Objects

Topics
- System Overview
- AB-STEP 7 TIA Portal Navigation
- AB-STEP 7 TIA Portal Communication
- Hardware
- Memory Allocation and Usage
- Tag Handling
- Program Instructions in STEP 7 TIA Portal
- Programming Blocks
- HMI
- Reference Data
- System Diagnostics
- Simulation
- Library Options
- System Diagnostics
- Simulation
- Library Options

4 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

Introduction to TIA Portal

Course code: **SCT-PTOILPLCI1A**

Target audience:
This course is for engineers and maintenance personnel who are new to SIMATIC S7 PLCs and who will be creating, modifying or troubleshooting S7 PLC systems using SIMATIC TIA Portal software.

Prerequisites
- MS Windows Expertise
- Basic industrial technology skills

Course Profile
This is a live instructor led on-line course delivered in 2 hour learning modules through the web. Access to fully functional STEP 7 Professional V13 software is provided through a cloud based application. Students are encouraged to complete assigned lab exercises during and after each session to reinforce the learning modules throughout the week. Professional Siemens instructors are available to answer student questions outside of scheduled class times.

Objectives
Upon completion of this course, the student shall be able to:
- Use STEP 7 Professional V13 (TIA Portal) to create a new development project.
- Navigate through an existing project using both the Portal View and the Project View.
- Configure an S7-1500 PLC with local I/O modules.
- Assign PLC tags.
- Identify key characteristics of program blocks.
- Identify important features of the automation
- languages LAD and FBD.

Topics
- Number Systems & IEC61131 Standard
- Introduction to the TIA Portal Development Environment
- PLC Program Blocks and Variables in the Program Editor
- Introduction to I/O and Addressing
- TIA Portal Automation Languages

4 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

TIA Portal Service 1

Course code: **SCT-PTTIAS1A**

Target audience
This course is designed for “first responders” to industry operations utilizing Siemens S7 automated control systems. Maintenance technicians, electricians, supervisors and others, who need an understanding of their Siemens control system, should attend this course to maximize line uptime.
PLEASE NOTE: If training in S7 PLC programming is required, please consider the SIMATIC TIA Portal Programming 1 course.

Prerequisites
- MS Windows Expertise

Course Profile
This first level service course teaches the basic S7 system concept, hardware configuration and parameterization, S7 software (SIMATIC TIA Portal) basics, and an overview of programming fundamentals. Human Machine Interface (HMI) and PROFINET IO basics
are also included.

Objectives
Upon completion of this course, the student shall be able to:
- Use standard STEP 7 tools and methods for Testing, Diagnosing, and Correcting hardware & software problems in a running program.
- Operate, Monitor, & Maintain components of a typical SIMATIC TIA system.
- Perform basic hardware assembly, cabling, wiring and testing.
- Establish PLC communication with multiple technologies.
- Retrieve, Archive, and Download S7 programs.

Topics
- System Overview
- Introduction: Engineering Software “TIA Portal”
- PLC Installation & Maintenance
- Device and Network
- Symbol Table
- Hardware Commissioning
- Program Blocks
- Binary Operations
- Introduction to Distributed I/O
- Introduction to HMI
- Introduction to the MicroMaster Drive

4.5 Days | Register here | More information

Automation – TIA Portal S7-1200 / S7-300 / S7-1500

Automation – SIMATIC S7 with TIA Portal

TIA Portal Service 2

Course code: **SCT-PTTIAS2A**

Target audience
This course is designed for SIMATIC S7-300-400 PLC users with basic SIMATIC control system knowledge who install or maintain automation systems and their application programs.

Prerequisites
- TIA Portal Service 1

Course Profile
This course continues skill development in troubleshooting and modifying a control system. Participants will use SIMATIC TIA Portal software tools to build new features, diagnostics and communications into the application project. Program development using organization blocks, system functions and instruction libraries build software troubleshooting efficiency. Analog signal processing and alarming are included in this application. Configuration and integration of an HMI and Drive system into the student's application builds experience managing a Totally Integrated Automation (TIA) project.

Objectives
Upon completion of this course, the student shall be able to:
- Use advanced STEP 7 tools and methods for Testing, Diagnosing, and Correcting hardware & software problems in a running program.
- Utilize the different block types (FC, FB, OB, and DB).
- Eliminate logical software errors, such as multiple assignments.
- Utilize principles of analog value processing.
- Use the data block access functions.
- Access and use the processed analog values utilizing STEP 7 GRAPH.
- Backup and document executed program changes

Topics
- Hardware and Software Review
- Data Blocks and Organization Blocks (OBs)
- Analog Processing
- Troubleshooting
- HMI
- Drive System

3 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

S7-1200 TIA System

Course code: **SCT-S712TP1A**

Target audience
This system course is for SIMATIC S7-1200 PLC users who are involved with developing or sustaining automation systems and their application programs. This course is for users needing advanced programming and configuration skills and who may use the extended system functions.

Prerequisites
- MS Windows Expertise

Course Profile
Additional Prerequisite: Solid industrial technology skills.

The goal of this course is to help the student build skills utilizing in programming and extended system functionality of the S7-1200 system, STEP 7 engineering tool and WinCC Basic, Human Machine Interface (HMI).

This course begins with a brief review of the SIMATIC S7-1200 system, its components and the HMI Basic Panels.

Objectives
Upon completion of this course, the student shall be able to:
- Identify the components and features of the S7-1200 system.
- Navigate the STEP 7 Portal software and identify the basic tool set.
- Complete a system hardware configuration including basic PC - PLC communications.
- Use the STEP 7 tools to monitor and troubleshoot the system.
- Build, document, test and troubleshoot a structured STEP 7 Basic program using the multiple address types and data blocks.
- Build a basic HMI project and integrate into the STEP 7 program.
- Use core application instructions, functions and blocks to build and test a basic control program.
- Efficiently used the diagnostics tools of STEP 7.

Topics
- SIMATIC S7-1200 family overview
- Introduction to STEP 7 Basic
- Device and Networks Portal with monitoring

4.5 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

TIA Portal Programming 1

Course code: **SCT-PTTIAP1A**

Target audience
This course is for SIMATIC S7-300/400 PLC users who are involved with developing or sustaining automation systems and their application programs.

Prerequisites
- MS Windows Expertise

Course Profile
This course is the first in a three part series which builds basic programming skills with Siemens STEP 7 software. Students will learn S7 project management, program design and application development. This is an aggressively paced curriculum covering the S7 programming editor with Ladder, Function Block Diagram, and Statement List, and SCL programming languages, and key software tools. This course takes a systems approach to the S7-300/400 PLCs, plus basic connectivity and functionality of an HMI, Drive, and PROFINET I/O.

Objectives
Upon completion of this course, the student shall be able to:
- Complete a system hardware configuration.
- Build, document, test and troubleshoot a structured STEP 7 program.
- Program using the multiple address types.
- Use symbolic addressing.
- Use core application instructions, functions and blocks.
- Program using the processed analog values.
- Generate data blocks.
- Establish connections to an HMI system.

Topics
- System Overview
- Introduction: Engineering Software "TIA Portal"
- Devices and Networks
- Symbol Table
- Program Blocks
- Binary Operations
- Digital Operations
- Introduction to Distributed I/O
- Introduction to HMI
- FCs and FBs
- Troubleshooting
- Introduction to the MICROMASTER Drive

4.5 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

TIA Portal Programming 2

Course code: **SCT-PTTIAP2A**

Target audience
This course is for SIMATIC S7-300/400 PLC users with basic engineering experience in the design and sustaining of SIMATIC automation systems and their application programs.

Prerequisites
- TIA Portal Programming 1

Course Profile
This course is the second in a three part series which increases skills with Siemens SIMATIC TIA Portal. Students will learn to leverage the power of TIA Portal software with advanced structured programming techniques. A systems approach to the integration of efficiently programming the S7-300/400 PLC, connectivity using PROFINET IO, functionality of an HMI, and integration of Micro Master Drive are the central focus of this course.

Objectives
Upon completion of this course, the student shall be able to:
- Leverage the power of Block and Function libraries.
- Use STL and SCL for advanced program development.
- Employ indirect addressing in a program.
- Incorporate System Functions (SFC) in a program.
- Integrate an HMI and Drive system with the PLC.
- Use Instance and Multi-Instance data Blocks.

Topics
- Analog value processing
- Functions, function blocks, and multi-instances using the IEC-compliant timer/ counter
- Jump commands and battery operations
- Indirect addressing
- Integration of a Micromaster drive (420) using PROFIBUS DP
- Monitoring and control of drive with "Starter" software
- Classical software error handling and evaluation with error organization blocks (OBs)
- Troubleshooting and alarms with an HMI device (Touch Panel 277B)

4.5 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

TIA Portal Programming 3

Course code: **SCT-PTTIAP3A**

Target audience
This course is for SIMATIC S7-1500, S7-1200, S7-300, and S7-400 PLC users with basic engineering experience in the design and sustaining of SIMATIC automation systems and their application programs.

Prerequisites
- TIA Portal Programming 2

Course Profile
The third in a three part series, this course will teach students to leverage the power of TIA Portal software with advanced structured programming techniques. A systems approach to efficiently programming the S7-1500, S7-1200, S7-300, and S7- 400 PLC is covered. Students will expand their knowledge regarding the reusability of STEP 7 blocks and their storage in user libraries while gaining an introduction to programming languages statement list (STL), Structured Control Language (SCL) and S7-GRAPH.

Objectives
Upon completion of this course, the student shall be able to:
- Apply knowledge of the advantages of optimally created blocks and be able to program them.
- Efficiently implement the concepts of multiple Instances.
- Declare variables of complex data types.
- Commission a given SCL block.
- Configure alarms using Alarm Number Method.
- Commission a PID controller with automatic optimization.
- Create user-specific blocks for reporting, handling and analyzing program errors.
- Manage recipes in SIMATIC HMI.
- Set-up communication between SIMATIC CPUs based on Industrial Ethernet.
- Integrate and connect to PROFINET IO, HMI, and the SINAMICS G120 Drive.

Topics
- Training Units and Addressing
- Hardware and Software Commissioning
- Reusable Blocks
- Complex Data and their Addressing
- Structured Control Language - SCL
- Recipes and Alarm Number Method
- Introduction to Industrial Communication
- Technology Objects

4.5 Days | Register here | More information

Automation - SIMATIC S7 with TIA Portal

S7 TIA Portal Distributed Safety Engineering

Course code: **SCT-PTSFTE1A**

Target audience
This course is for engineers and personnel responsible for implementing and maintaining SIMATIC S7 TIA Portal Distributed Safety systems.

Prerequisites
- TIA Portal Programming 1 OR
- TIA Portal Service 1

Course Profile
This course introduces the student to a Siemens Distributed Safety PLC application. Participants receive knowledge on applying the system per relevant standards, Failsafe
Hardware Module details and parameterization, Safety Program structure and implementation, Safety Communications, System Diagnostics and introduction to Drive Safety. The course format is a combination of instruction and hands-on exercises. A realistic model is used for demonstrations and student exercises. Exercises allow students to practice tasks such as configuration, programming, and code debugging.

Objectives
Upon completion of this course, the student shall be able to:
- Locate and understand the applicability of the detailed documentation and development resources
- Select and configure the Failsafe Hardware components, and understand their application restrictions.
- Properly implement a Safety program in the PLC.
- Document, test, and troubleshoot the system.

Topics
- Introduction to Distributed Safety
- Standards discussion
- ET 200SP distributed I/O system
- Hardware Configuration
- Safety Advanced: Programming
- Fail-safe Communication
- F-system Response Times

3 Days | Register here | More information

Automation – TIA Portal S7-1200 / S7-300 / S7-1500

Virtual Instructor-led Training

S7 TIA Portal Programming with SCL

Course code: **SCT-PTOILSCLP3A**

Target audience
This course is for engineering and maintenance personnel, who create, diagnose and troubleshoot SIMATIC TIA Portal applications with Structured Control Language (SCL) content.

Prerequisites
- TIA Portal Programming 1

Course Profile
This course provides an in depth look at STEP 7 programming and program troubleshooting with a focus on the Structured Control Language (SCL) –a PASCAL similar high level text language for programming mathematical algorithms, data management and organization tasks for Siemens automation systems. Students should have a solid working knowledge of STEP 7, TIA Portal and the basic diagnostics and editor tools. This is a hands-on course filled with programming exercises in SCL. Students will use advanced software tools of TIA Portal including PLCSIM to complete system integration programming, troubleshooting, and functional testing of applications.

Objectives
Upon completion of this course, the student shall be able to:
- Efficiently use the TIA Portal program editor tools.
- Use the TIA Portal program monitor, diagnostics and troubleshooting tools.
- Build and modify SCL programs.
- Package an SCL program into a custom library block and use within a TIA Portal project.
- Explore the SCL syntax requirements and the system debug functions.
- Use PLCSIM software to simulate PLC hardware and test user defined SCL program code.

Topics
- The TIA Portal
- SCL Overview
- SCL Program Structure
- SCL Syntax
- SCL Data Types
- SCL Declarations
- SCL Mathematical and Logical Operations
- SCL Control Instructions

Sample Header

TIA Portal Certification Test

Course code: **SCT-PTTIAC3A**

Target audience
This Siemens TIA Portal Programmer Certification Test is intended for experienced TIA Portal programmers who have met the prerequisites below and have applied skills.

Prerequisites
- Advanced Programming Experience
- TIA Portal Programming 1 & TIA Portal Programming 2 & TIA Portal Programming 3

Course Profile
This is a comprehensive performance test designed to assess the skills of a PLC (Programmable Logic Controller) programmer applicant for Siemens PLC systems.

This is a practical, skills-based certification test covering topics taught during TIA Programming 1, 2, and 3. It is recommended that the student attend the "Siemens Certified Programmer Refresher" in preparation for the test (course code SCT-PTTIAR1A). Students will be provided a set of programming tasks and are expected to demonstrate skills and best practices.

Topics
- This is a comprehensive performance test designed to assess the skills of a PLC (Programmable Logic Controller) programmer applicant for Siemens PLC systems.
- Passing the test entitles the participant to be awarded “Siemens Certified Programmer” status recognized globally by Siemens, distributors, partners and other companies.
- At minimum, prerequisites must be met in order to take the Siemens Programmer Certification Test.
- Taking the recommended Siemens “Certified Programmer review course” provides a quality hands-on review of all needed skills prior to taking the certification test.

Sample Header

TIA Portal Programmer Refresher

Course code: **SCT-PTTIAR1A**

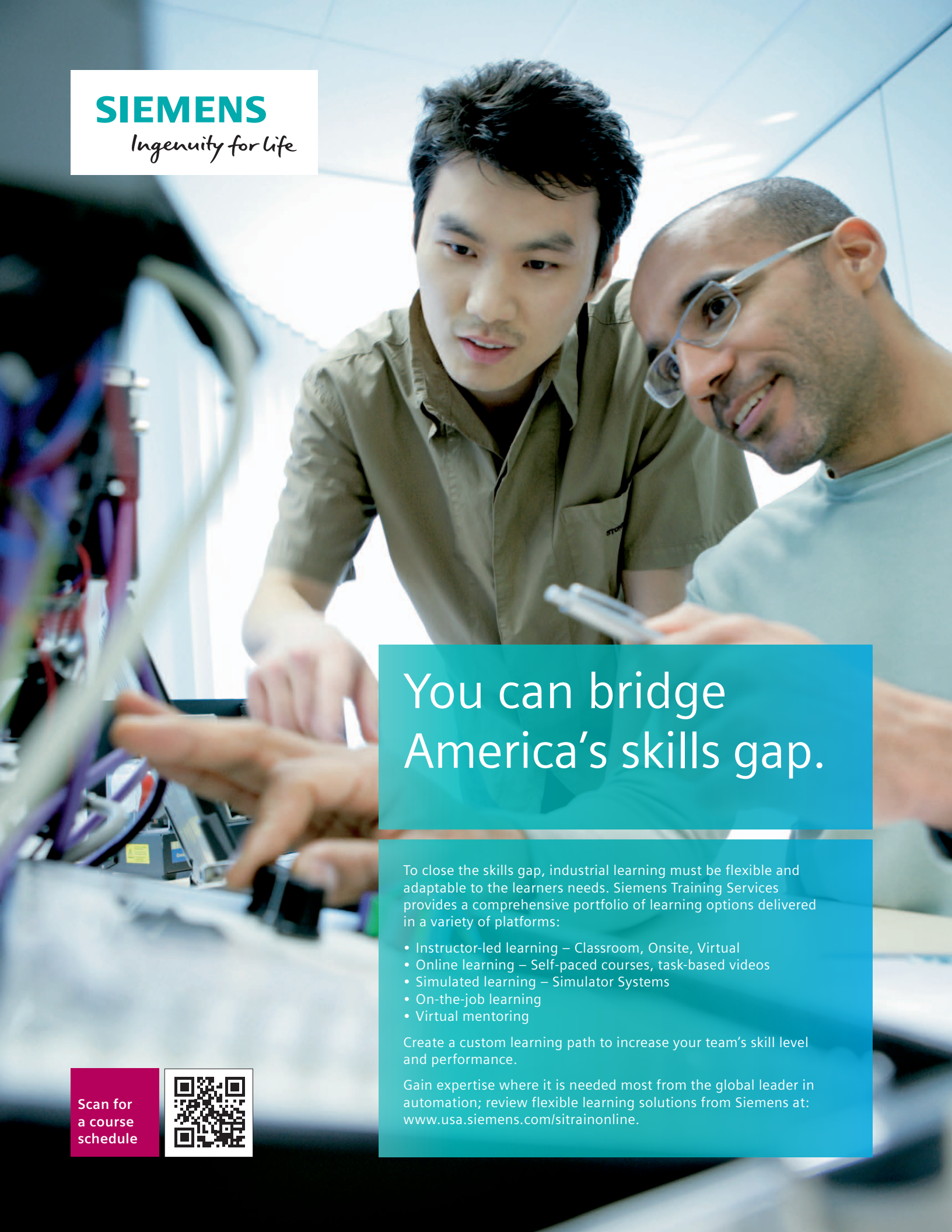
Target audience
This course is intended for experienced TIA Portal programmers seeking a Siemens Certification which is recognized globally. This refresher course will help prepare the participant for the Siemens Certified Programmer, in the TIA Portal, Certification Test.

Prerequisites
- TIA Portal Programming 1 & TIA Portal Programming 2 & TIA Portal Programming 3

Course Profile
This hands-on, instructor led course provides a focused review and skills refresher of topics taught in TIA Portal Programming 1, 2, and 3 courses. This refresher is intended to prepare the student for the Siemens Certified Programmer Test, course code SCT-PTTIAC1A. The certification test is conducted separately from the refresher course and is typically scheduled on the day following the refresher course.

Objectives
Upon completion of this course, the student shall be able to successfully complete the Siemens Certified Programmer, in the TIA Portal, Test.

Topics
- Course Overview
- Hardware
- Tag (Symbol) Table
- Program principles
- Troubleshooting Program errors
- HMI
- MICROMASTER Drive
- Independent Project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Scan for a course schedule

– SIMATIC HMI / SIMATIC HMI with TIA Portal

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from the Online Self-paced Training *Automation: Siemens* and *Maintenance: Siemens PLCs* categories. An arrow indicates a prerequisite for the next course.

TIA Portal

WinCC Professional

TIA Portal WinCC Professional Configuration (SCADA) — 4.5 DAYS
SCT-PTWCSP1A

TIA Portal WinCC Professional (SCADA) Upgrade — 3 DAYS
SCT-PTWCSU2A

WinCC Comfort/Advanced

TIA Portal WinCC Comfort / Advanced Configuration — 4.5 DAYS
SCT-PTWCSU2A

Classic

WinCC SCADA

SIMATIC WinCC SCADA Configuration — 4.5 DAYS
SCT-S7WINC1B

SIMATIC WinCC SCADA Advanced Database — 4 DAYS
SCT-S7WINC2B

SIMATIC WinCC SCADA Sustaining — 4.5 DAYS
SCT-S7WINM1A

WinCC Flexible

Introduction to WinCC Flexible (Virtual Instructor-led) — 10 HOURS
SCT-S7OILWFXC1A

SIMATIC HMI Panel with WinCC Flexible — 4.5 DAYS
SCT-S7WFXC1A

WinCC Flexible with HMI Lite — 3 DAYS
SCT-S7TLWM1A

VIDEO

How-to Video Library
Reinforces learning in the *Automation - SIMATIC S7 with STEP 7 v5.5* and *CNC - SINUMERIK Power Line* categories.

Automation – SIMATIC HMI

SIMATIC HMI Panel with WinCC Flexible

Course code: **SCT-S7WFXC1A**

Target audience
This course is for automated control engineers or maintenance staff who will be designing, configuring or maintaining a control system application configured with Siemens WinCC Flexible software.

Course Profile
This course provides a comprehensive review of the features and capabilities of Siemens WinCC Flexible software. Students will perform a complete system configuration including project configuration, graphics design and system integration. Students will also build skills with the user management tools including security, access, alarms and messaging. Advanced functionality such as recipe creation and scripting are briefly introduced through scenario applications.
The course concludes with Siemens unique Sm@rt services for plant wide web and system access. Throughout this course lecture materials are complimented with hands-on exercises which build a working WinCC Flexible application.

Objectives
Upon completion of this course, the student shall be able to:
- Create and manage a WinCC Flex project.
- Integrate components between WinCC Flex and STEP 7.
- Create tags from the STEP 7 symbol table.
- Design graphic screens and tools.
- Configure internal and external tags.
- Define & administer user security.
- Set and test the Alarms and Messages.
- Configure, archive and display trends.
- Understand basic recipe building.
- Understand basic scripting services.
- Understand Sm@rt Services.

Topics
- WinCC Flexible System Overview
- Basic Graphics Design
- Advanced Graphics Design
- User Management
- Process Value Archiving
- Recipe Management
- Run-Time Scripting
- Sm@rt Access and Service

Automation – SIMATIC HMI

SIMATIC WinCC SCADA Advanced Database

Course code: **SCT-S7WINC2B**

Target audience
This course is for engineers with prior experience with commissioning WinCC HMI / SCADA applications who want to learn to implement database solutions within WinCC Applications.

Prerequisites
- SIMATIC WinCC SCADA Configuration OR SIMATIC WinCC for Integrators

Course Profile
This course provides an overview of Database technologies that are relevant to SIMATIC WinCC. Students will learn the basics of using the SQL Programming Language within SQL Server 2005, and learn to use these skills within a WinCC Application. Students will use ADO technology to execute SQL queries directly from VBS Scripts within WinCC. Students will also understand how WinCC stores its Configuration and Runtime data within SQL Server. A discussion of User Archives option, Connectivity pack,
and WinCC Audit will also be covered.

Objectives
Upon completion of this course, the student shall be able to:
- Describe the purpose and usage of Database Technologies relevant to WinCC 7.x.
- Describe the SQL Server 2005 Management Studio Interface
- State purpose and scope of the SQL Programming language
- Create simple and complex Select statements
- Use Insert, update and delete SQL Statements to manage database data.
- Create, edit and drop tables via SQL Scripts.
- Write and execute a simple stored procedure
- Execute SQL Scripts from WinCC VBS Scripts.

Topics
- Database Technologies Overview
- SQL Language Overview
- SQL Select Statements
- SQL Sub Queries and Joins
- SQL Data Manipulation
- User Archives
- Reports Designer

Automation - SIMATIC HMI

SIMATIC WinCC SCADA Configuration

Course code: **SCT-S7WINC1B**

Target audience
This course is for PLC users with engineering or maintenance experience who will be designing and configuring automation systems and their application programs using Siemens Windows Control Center (WinCC).

Course Profile
Using a model application, this course provides a system overview of WinCC with emphasis on its capabilities and special features. Detailed configuration procedures will be studied in an order compatible with the typical development of an industrial application. Students will learn the correct development process beginning with creating a project and concluding with reporting and printing. Examples of programs that can be written to take advantage of WinCC open architecture are discussed. Throughout this course lecture materials are complimented with hands-on exercises which build a working WinCC application.

Objectives
Upon completion of this course, the student shall be able to:
- Create and manage WinCC Projects.
- Integrate components between WinCC and Step 7.
- Create WinCC tags STEP 7 symbol table.
- Establish communications with the PLC.
- Design a complex graphic.
- Configure internal and external tags.
- Define & Administer User Security.
- Set and test the WinCC Alarms and Messages.
- Configure, archive and display Trends & Tables.
- Configure, preview and print Reports.

Topics
- WinCC System Overview
- Windows NT and 2000
- WinCC Explorer
- Graphics Designer
- Making Objects Dynamic
- The Global Scripts Editor
- User Administration & Security
- Alarm-Logging / Messages
- Archiving & Trending
- Reports Designer

Automation – SIMATIC HMI / SIMATIC HMI with TIA Portal

Automation – SIMATIC HMI with TIA Portal

TIA Portal WinCC Comfort / Advanced Configuration

Course code: **SCT-PTWCMP1A**

Target audience
This course is for automation control engineers or maintenance staff designing, configuring or maintaining a control system application configured with SIMATIC TIA Portal WinCC Advanced software. *NOTE: This TIA Portal course is for configuring Panels and/or Machine mounted HMI.

Prerequisites
- Basic knowledge of automation technology.

Course Profile
This course provides a comprehensive review of the features and capabilities of Siemens SIMATIC TIA Portal WinCC Advanced software. Students will perform a complete system configuration including project configuration, graphics design and system integration. Students will also build skills with the user management tools including security, access, alarms, and messaging.

Objectives
Upon completion of this course, the student shall be able to:
- Create and manage a WinCC Advanced project.
- Integrate components between WinCC Flex and STEP 7.
- Create tags from the STEP 7 symbol table.
- Design graphic screens and tools.
- Configure internal and external tags.
- Define & administer user security.
- Set and test the Alarms and Messages.
- Configure, archive and display trends.
- Configure a basic recipe.

Topics
- WinCC Advanced System Overview
- Creating and transferring a Project
- Basic Graphics Design
- Advanced Configuration Functions
- User Management
- The Message System
- Tag Logging (Archiving), Trends, and Trend Configuration
- Recipe Management

3 Days | Register here | More information

Automation – SIMATIC HMI with TIA Portal

TIA Portal WinCC Professional Configuration (SCADA)

Course code: **SCT-PTWCSP1A**

Target audience
This course is for PLC users with engineering or maintenance experience who will be designing and configuring automation systems and their application programs using Siemens TIA Portal Windows Control Center (WinCC) Professional SCADA (Supervisory Control and Data Acquisition). NOTE: This TIA Portal course is for configuring WinCC

Prerequisites
- Basic knowledge of automation technology.

Course Profile
Using a model application, this course provides a system overview of WinCC Professional with emphasis on its capabilities and special features. Detailed configuration procedures will be studied in an order compatible with the typical development of an industrial application.

Objectives
Upon completion of this course, the student shall be able to:
- Create and manage WinCC Projects.
- Integrate components between WinCC and TIA Portal.
- Create WinCC tags in STEP 7 symbol table.
- Establish communications with the PLC.
- Design a complex graphic.
- Configure internal and external tags.
- Define & Administer User Security.
- Set and test the WinCC Alarms and Messages.

Topics
- System overview TIA Portal,
- SIMATIC WinCC (SCADA)
- Creating a SIMATIC WinCC Professional project and user administration
- Configuring the connection to the
- SIMATIC S7 automation system
- Structuring the operator interface.
- Fundamentals of creating graphics displays for human machine interfaces.
- Navigating through the plant displays
- Message representation, message logging, message configuring
- Variable logging, trend configuring and plotting

4.5 Days | Register here | More information

Automation – SIMATIC HMI with TIA Portal

TIA Portal WinCC Professional (SCADA) Upgrade

Course code: **SCT-PTWCSU2A**

Target audience
This course is for automation control engineers or, maintenance staff possessing solid working skills with Siemens WinCC configuration software and, moving to Siemens SIMATIC TIA Portal WinCC Professional software.

Prerequisites
- SIMATIC WinCC SCADA Configuration

Course Profile
This course provides fast-track training of the tools, features and capabilities of Siemens SIMATIC TIA Portal WinCC Professional software. Students must have previous Siemens WinCC software experience to attend this class. The key configuration and integration issues unique to SIMATIC TIA Portal WinCC Professional will be covered in this course.

Objectives
Upon completion of this course, the student shall be able to:
- Explore the basic tools of SIMATIC TIA Portal WinCC Professional (SCADA).
- Integrate components between WinCC SCADA and STEP 7.
- Create tags from the TIA Portal symbol table.
- Configure internal and external tags.
- Migrate WinCC project to SIMATIC TIA Portal WinCC Professional project.
- Commission a SIMATIC TIA Portal WinCC Professional project.

Topics
- System Overview
- Creating a SIMATIC TIA Portal WinCC Professional project
- Configuring the connection to the SIMATIC S7 automation system
- Basic Graphics Design Overview
- The Message System
- User Management
- Project Migration Tools
- Project Commissioning

3 Days | Register here | More information

Virtual Instructor-led Training

Introduction to WinCC Flexible

Course code: **SCT-S7OILWFXC1A**

Target audience
This course is for automation control engineers or maintenance staff who will be designing, configuring or maintaining a control system application configured with Siemens WinCC Flexible software.

Course Profile
This course provides a rich introduction to the features and capabilities of Siemens WinCC Flexible software. Students will perform a system configuration including project configuration, graphics design and system integration. Throughout this course lecture materials are complimented with hands-on exercises which build a working WinCC Flexible application. This is a hands-on course filled with configuration exercises in WinCC Flexible. Students will use advanced software tools of STEP 7 including PLCSIM to complete system configuration, troubleshooting, and functional testing of applications.
Messaging, alarms, security, and archiving will not be covered in this introduction.

Objectives
Upon completion of this course, the student shall be able to:
- Create and manage a WinCC Flex project.
- Integrate components between WinCC Flex and STEP 7.
- Create tags from the STEP 7 symbol table.
- Design graphic screens and tools.
- Configure internal and external tags.
- Use PLCSIM software to simulate PLC hardware and test user defined WinCC Flexible project.

Topics
- WinCC Flexible System Overview
- The Project
- Basic Graphics Design
- Advanced Graphics Design

Automation – SIMATIC NET

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from the Online Self-paced Training *Maintenance: PLCs* and *Maintenance: Robotics* categories. An arrow indicates a prerequisite for the next course.

Maintenance

SIMATIC NET PROFIBUS, Ethernet, PROFINET — 4.5 DAYS

SCT-S7NETS1A

Engineering Core

SIMATIC NET PROFIBUS, Ethernet, PROFINET — 4.5 DAYS

SCT-S7NETS1A

PROFINET — 3 DAYS

SCT-S7PNTP1B

VIDEO

How-to Video Library
Reinforces learning in the *Automation - SIMATIC S7 with STEP 7 v5.5*.

Automation – SIMATIC NET

PROFINET

Course code: **SCT-S7PNTP1B**

Target audience
This course is for maintenance personnel involved with sustaining or commissioning S7 industrial Ethernet / PROFINET network.

Prerequisites
- S7 TIA Programming 1 OR
- S7 Automation Maintenance 1 AND S7 Automation Maintenance 2

Course Profile
This course provides a working knowledge of Industrial Ethernet and PROFINET networks within an S7 PLC automation system. Students will build skills with the basics of network installations, configuration and troubleshooting.

Objectives
Upon completion of this course, the student shall be able to:
- Describe and view Industrial Network architecture and components.
- Install and configure a simple PROFINET network including, PC connection, interface modules, couplers, software and cables
- Configure and troubleshoot SEND/RECEIVE
- Perform network diagnostics using the NCM and SIMATIC Net tools
- Install and address various network connections and components.

Topics
- Introduction to Industrial Ethernet
- PROFINET I/O
- PROFINET Topology
- Network Troubleshooting
- I-Shared Devices
- Web Server Overview
- Exercises

3 Days | Register here | More information

Automation – SIMATIC NET

SIMATIC NET PROFIBUS, Ethernet, PROFINET

Course code: **SCT-S7NETS1A**

Target audience
This course is for engineering and maintenance personnel involved with the sustaining or commissioning of S7 industrial networks.

Prerequisites
- S7 TIA Programming 1 OR S7 Automation Maintenance 1

Course Profile
This course provides a working knowledge of Industrial Ethernet, PROFIBUS and Actuator-Sensor Interface (AS-i) networks within an S7 PLC automation system. Students will build skills with the basics of network installations, configuration and troubleshooting. This course covers sensor, field and enterprise level networks including hardware and software requirements, topologies and installation rules.

Objectives
Upon completion of this course, the student shall be able to:
- Describe the various Industrial Networking options and terminology in the S7 environment.
- Install and configure simple networks including, interface modules, software and cables
- Configure and troubleshoot SEND/RECEIVE connections
- Use the OSI and IP protocols.
- Install and address various sensor and field devices including 3rd party devices.

Topics
- Introduction to SIMATIC NET
- Network components and installation guidelines
- ISO Transport Protocol (IE and FDL)
- TCP/IP Protocol
- Communication Processor (CPs) Options
- NCM software overview
- S7 Communication functions
- SIMATIC Manager network projects
- Network Configurations
- Error trapping diagnostics for PROFIBUS DP
- Network performance
- AS-I Network Overview
- Introduction to OPC Server

4.5 Days | Register here | More information

Automation – SIMATIC S5

Automation – SIMATIC S5

S5 Maintenance & Programming 1

Course code: **SCT-S5SP5G1A**

Target audience
This course is for maintenance technicians and controls engineers who are responsible for sustaining and upgrading SIMATIC S5 systems and their programs.

Prerequisites
- Computer Expertise

Course Profile
This course provides the basic skills necessary to troubleshoot S5 hardware and modify programs using STEP5 software. Students will build skills with a typical S5 hardware sustaining ranging from module wiring and configuration to parameterization and addressing.

Objectives
Upon completion of this course, the student shall be able to:
- Build a basic S5 hardware configuration
- Troubleshoot the system hardware using status indicators and STEP5 software tools
- Program discrete logic operations (AND, OR, etc.)
- Create and edit documentation
- Program timers and counters (time, count events, etc.)
- Program comparison operations
- Program integer math operations
- Troubleshoot common software errors

Topics
- Fundamental control concepts
- Programming basics
- Hardware overview
- Digital operations
- Counters, compares, and arithmetic
- Timer operations
- Introduction to Data and Function blocks
- Troubleshooting

4.5 Days | Register here | More information

Automation – SIMATIC S5

S5 Maintenance & Programming 2

Course code: **SCT-S5SP5G2A**

Target audience
This course is for maintenance technicians and controls engineers who are responsible for advanced troubleshooting and program modifications for the SIMATIC S5 system.

Prerequisites
- S5 Maintenance & Programming 1

Course Profile
This course provides advanced level skills in system troubleshooting and program modifications. Students will concentrate on the Supplemental Operation Set and the creation and diagnostics of system function blocks. Students will also gain experience with Statement List instructions (STL). Advanced hardware, communications and diagnostics will be reinforced in this course. Students will build skills in analog signal processing and troubleshooting. Students will also modify or develop programs that will be loaded into a SIMATIC S5 controller with field simulation using a PG740 programming unit (or equivalent) to test its operation.

Objectives
Upon completion of this course, the student shall be able to:
- Utilize STEP 5 instructions from the supplemental operations set.
- Write or modify programs for analog I/O.
- Create user defined function blocks without formal operands.
- Create user created function blocks with formal operands.
- Utilize indirect addressing techniques.
- Create and use basic STL program code.
- Perform advanced hardware configuration and troubleshooting tasks.

Topics
- Program structure
- Function Blocks (FBs)
- Programming user-defined function blocks
- Organization Blocks (OBs)
- Analog input and output

4.5 Days | Register here | More information

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Machine Tool – Power Line / HMI Advanced

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from the Online Self-paced Training *Machining: Siemens CNC* and *Machining: CNC* categories. An arrow indicates prerequisite for next course.

840D Power Line Operator

D Series Operations & Programming 1 w/ HMI Advanced — 4.5 DAYS
SCT-SN84DP1B

↓

D Series Operations & Programming 2 w/ HMI Advanced — 4.5 DAYS
SCT-SN84DP2B

840D Power Line Maintenance

S7 Programming 1 — 4.5 DAYS
SCT-S7TIAP1B

↓

840Dpl Maintenance 1 w/ HMI Advanced — 4.5 DAYS
SCT-SN84DM1A

↓

840Dpl Maintenance 2 w/ HMI Advanced — 4.5 DAYS
SCT-SN84DM2A

840D Safety Integrated Maintenance

S7 Programming 1 — 4.5 DAYS
SCT-S7TIAP1B

↓

840Dpl Maintenance 1 w/ HMI Advanced — 4.5 DAYS
SCT-SN84DM1A

↓

840Dpl Maintenance 2 w/ HMI Advanced — 4.5 DAYS
SCT-SN84DM2A

↓

840Dpl Safety Integrated Maintenance — 4.5 DAYS
SCT-SNSSIM2A

VIDEO

How-to Video Library
Reinforces learning in the *CNC-SINUMERIK Power Line* category.

CNC – SINUMERIK Power Line

840Dpl Maintenance 1 w/ HMI Advanced

Course code: **SCT-SN84DM1A**

Target audience
This course is for maintenance personnel of CNC machines that utilize the SINUMERIK 840D / 810D controls, using the MMC-103 or PCU-50 Operator Interfaces. Personnel using the MMC-100.2 or HT-6 Operator Interfaces are urged to contact Siemens Customer Training prior to enrolling in this class.

Prerequisites
- Microsoft Windows XP Expertise

Course Profile
This course emphasizes the maintenance aspects of the control. A complete overview of the softkey menus of the SINUMERIK D-series control is provided, including the basic principles of operating the control. Demonstrations are given on how to competently manage maintenance functions and how to backup and restore the PLC program and control data. Class format is predominately hands-on exercises.

Objectives
Upon completion of this course, the student shall be able to:
- Edit and store machine data.
- Back-up and restore control data to the internal hard drive.
- Back-up and restore PLC program data to the internal hard drive.
- Back-up and restore data to an external data medium.
- Diagnose problems using Siemens generated alarm displays.
- Use on screen help functions to help diagnose alarm related problems.
- Understand the hardware configuration.
- Access and utilize major operating areas of the control.

Topics
- SERVICES, DIAGNOSIS AND START-UP navigation
- Data back-up and restoration
- Diagnostic functions using Siemens generated alarms and LED displays
- Hardware Overview

4.5 Days | Register here | More information

CNC – SINUMERIK Power Line

840Dpl Maintenance 2 w/ HMI Advanced

Course code: **SCT-SN84DM2A**

Target audience
This course is for maintenance personnel of CNC machines that utilize the SINUMERIK 840D / 810D controls, using the MMC-103 or PCU-50 Operator Interfaces. Personnel using the MMC-100.2 or HT-6 Operator Interfaces are urged to contact Siemens Customer Training prior to enrolling in this class.

Prerequisites
- 840Dpl Maintenance 1 w/HMI Advanced

Course Profile
This course provides a complete overview of the system hardware, software and configuration of the SINUMERIK 840D CNC, and it and apos - s integrated SIMODRIVE 611D Digital Servo drive system. The course includes information regarding the hardware, configuration, and commissioning procedures for utilization of the SIMODRIVE 611D. Class format is predominately hands-on exercises.

Objectives
Upon completion of this course, the student shall be able to:
- Back-up and restore all data to the MMC-103/ PCU-50, using Symantec GHOST software.
- Access and interpret the control's status displays for troubleshooting purposes.
- Analyze system messages, alarm messages, and LED indications to identify failures.
- Set and/or adjust specific machine data in the control.
- Optimize a closed loop position control system.

Topics
- Initialization of the control
- Initialization of the digital servo system
- System data back-up and restoration
- PLC User program back-up
- Interface signals and status display function
- Axis position control
- Spindle control
- Identifying OEM generated alarms and operator messages
- NC Auxiliary functions
- Identification and setting of 611-D module and motor data in the 840D
- Diagnosis of servo problems in the 840D

4.5 Days | Register here | More information

CNC – SINUMERIK Power Line

840Dpl Safety Integrated Maintenance

Course code: **SCT-SNSSIM2A**

Target audience
This advanced course is designed for controls engineers and service specialists who use the SINUMERIK 840D and Safety Integrated (SI) functions in machine tool applications.

Prerequisites
- 840Dpl Maintenance 2 w/HMI Advanced

Course Profile
This course provides the knowledge and skills that controls engineers and/or maintenance technicians require for familiarization and the operation of an automated machine tool, equipped with a SINUMERIK 840D CNC which uses the optional Safety Integrated System.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concepts of safety technology and the system requirements for Safety Integrated.
- Have a working knowledge of safety-oriented inputs and outputs for DMP Modules.
- Have a working knowledge of safety-oriented inputs and outputs for Profi Safe Modules.
- Understand the principles related to safe communication.
- Identify, understand, and use Machine Data and interface signals related to Safety Integrated applications.
- Perform error detection procedures related to Safety Integrated applications.
- Evaluate diagnostics and alarm displays
- Understand and perform Test Stop procedures.
- Understand Safety Integrated systems with SAFE SPL and without SAFE SPL.

Topics
- Safety-oriented inputs and outputs
- Safe Standstill
- Safe operational stop
- Securely reduced speed
- Safe software limit switches
- Safe stopping process
- Safe programmable logic
- Safety related Machine Data
- Understand OEM safety related alarms
- Understand checksums

4.5 Days | Register here | More information

Machine Tool – Power Line / HMI Advanced

CNC – SINUMERIK Power Line

D Series Operations & Programming 1 w/ HMI Advanced

Course code: **SCT-SN84DP1B**

Target audience
This course is for Operator/Programmers of CNC machines that utilize the SINUMERIK 840D / 810D / 840Di controls, with MMC-103 or PCU-50 Operator Interfaces. Personnel who are using the MMC-100.2 or HT-6 Operator Interfaces are urged to contact Siemens Customer Training prior to enrolling in this class.

Prerequisites
- MS Windows Expertise

Course Profile
This course provides a complete overview of the softkey menus of the SINUMERIK D-series CNC and describes the basic principles of operating the control. Demonstrations are given on how to manage part programs, define offsets, and restore programs and control data.
Class format is predominately hands-on exercises. Students use SINUMERIK 840D CNC simulators to build proficiency in moving through various menus and in managing part programs.

Objectives
Upon completion of this course, the student shall be able to:
- Edit and store part programs in editing mode, using Siemens-installed editors.
- Back-up and restore workpieces, part programs, and control data to/from internal hard drive.
- Back-up and restore workpieces, part programs, and control data to/from an external data medium.

Topics
- Program management
- Program and subprogram directories
- The Workpiece directory
- Editing subprograms and part programs
- Saving programs to the hard disk
- Saving workpieces and programs to an external data medium

4.5 Days | Register here | More information

CNC – SINUMERIK Power Line

D Series Operations & Programming 2 w/ HMI Advanced

Course code: **SCT-SN84DP2B**

Target audience
This course is for Programmers/Engineers who need an advanced understanding of the programming dialect used in the SINUMERIK 840D controls, with a PCU-50/70 Operating Interface.

Prerequisites
- D Series Operations & Programming 1 w/ HMI Advanced

Course Profile
The programming language of the control still retains G-codes, and in fact, can be programmed exclusively using the traditional G-code functions. However, the D-series controls (840D, 840Di, 810D) offer many additional preparatory commands and functions which are currently unique.
The course format is a combination of instruction and hands-on exercises. SINUMERIK 840D CNC simulators are set up in the classroom, and configured to simulate an application. Students are assigned practice programs to complete and are encouraged to present machine specific program applications for review within the classroom environment.

Objectives
Upon completion of this course, the student shall be able to:
- Write simple programs for standard machining operations.
- Explain the use of machining (canned) cycles.
- Describe how predefined subroutines and preparatory functions are used.
- Define essential terms
- Describe some of the more sophisticated programming functions

Topics
- Program definitions: Axis coordinating systems, machining cycles and transformations
- File management
- Contour definitions: Interpolation commands, tool compensation/frames, and transition commands
- Variables and arguments
- Advanced functions including NC/PLC Synchronized actions

4.5 Days | Register here | More information

SIEMENS
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SITRAIN courses for the Machine Tool Industry

Machine Tool – Solution Line / HMI Advanced / HMI Operate

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from the Online Self-paced Training *Machining: Siemens CNC* and *Machining: CNC* categories. An arrow indicates prerequisite for next course.

840D Solution Line HMI Advanced Maintenance

- **S7 Programming 1** — 4.5 DAYS — SCT-S7TIAP1B
- **840Dsl Maintenance 1 w/ HMI Advanced** — 4.5 DAYS — SCT-SN84SM1A
- **840Dsl Maintenance 2 w/ HMI Advanced** — 4.5 DAYS — SCT-SN84SM2A

840D Solution Line HMI Operate Maintenance

- **S7 Programming 1** — 4.5 DAYS — SCT-S7TIAP1B
- **840Dsl Maintenance 1 w/ Operate** — 4.5 DAYS — SCT-SNSLM1A-OP
- **840Dsl Maintenance 2 w/ Operate** — 4.5 DAYS — SCT-SNSLM2A-OP

840D Safety Integrated Maintenance

- **S7 Programming 1** — 4.5 DAYS — SCT-S7TIAP1B
- **840Dsl Maintenance 1 w/ Operate** — 4.5 DAYS — SCT-SNSLM1A-OP
- **840Dsl Maintenance 2 w/ Operate** — 4.5 DAYS — SCT-SNSLM2A-OP
- **840Dsl Safety Integrated Maintenance** — 4.5 DAYS — SCT-SNSLSM1A

840D Solution Line HMI Advanced Operator

- **D Series Operations & Programming 1 w/ HMI Advanced** — 4.5 DAYS — SCT-SN84DP1B
- **D Series Operations & Programming 2 w/ HMI Advanced** — 4.5 DAYS — SCT-SN84DP2B
- **840Dsl Maintenance 2 w/ HMI Advanced** — 4.5 DAYS — SCT-SN84SM2A

840D Solution Line HMI Operate Operator

- **840Dsl Operations & Programming 1 w/ HMI Operate** — 4.5 DAYS — SCT-SNSLP1A-OP

840D Safety Integrated OEM

- **840Dsl Safety Integrated for OEMs** — 4.5 DAYS — SCT-SNDSLI1A

VIDEO

How-to Video Library
Reinforces learning in the *CNC-SINUMERIK Solution Line* category coming soon.

CNC – SINUMERIK Solution Line

840Dsl Maintenance 1 w/ HMI Advanced

Course code: **SCT-SN84SM1A**

Target audience
This course is designed for electrical/electronic end-user maintenance personnel for machine tools using the new SINUMERIK 840Dsl (Solution Line) controls. The course presumes the customer is using the PCU 50.3, Windows XP-based HMI Advanced software. Personnel using the PCU 20 / HT8 / or HMI TCU (Thin Client Unit) interfaces are urged to contact Siemens Customer Training prior to enrolling in this class.

Prerequisites
- Microsoft Windows XP Expertise

Course Profile
This course emphasizes the maintenance aspects of this new version of the SINUMERIK 840D. An overview of the softkey menus of the control is provided, including the basic principles of operating the control. Demonstrations are given on how to competently manage maintenance functions, and for back-up/restore functions of the NC and PLC series start-up.

Objectives
Upon completion of this course, the student shall be able to:
- Identify the major SINAMICS S120 hardware and indicators in an 840Dsl application.
- Access and utilize the major operating areas of the control.
- Edit and store machine data.
- Back-up and restore NC data to the internal hard drive.
- Back-up and restore PLC program data to the internal hard drive.
- Back-up and restore PROFIBUS drive data to the internal hard drive.
- Back-up and restore NC data to an external data medium.
- Back-up and restore PLC program data to an external data medium.
- Back-up and restore PROFIBUS drive data to an external data medium.

Topics
- Data back-up and restoration
- Diagnostic functions
- Hardware Overview

CNC – SINUMERIK Solution Line

840Dsl Maintenance 1 w/ Operate

Course code: **SCT-SNSLM1A-OP**

Target audience
This course is designed for electrical/electronic end-user maintenance personnel for machine tools using the new SINUMERIK 840Dsl (Solution Line) controls. This course presumes the customer is using the PCU 50 or an HMI TCU (Thin Client Unit), with the SINUMERIK Operate system platform.

Prerequisites
- MS Windows Expertise

Course Profile
This course emphasizes the maintenance aspects of this new version of the SINUMERIK 840D. An overview of the soft key menus of the control is provided, including the basic principles of operating the control. Demonstrations are given on how to competently manage maintenance functions, and for back-up/restore functions of the NC, PLC and PROFIBUS Drive series start-up archive files.

Objectives
Upon completion of this course, the student shall be able to:
- Identify the major SINAMICS S120 hardware and indicators in an 840Dsl application.
- Access and utilize the major operating areas.
- Edit and store machine data.
- Back-up and restore NC data, PLC program and PROFIBUS drive data to the internal hard drive or System CF Card.
- Back-up and restore NC data, PLC program and PROFIBUS drive data to an external data medium.
- Diagnose problems using SIEMENS generated alarm displays.
- Use on-screen help functions to help diagnose alarm related problems.
- Perform file management functions using System Data Management.

Topics
- Data back-up and restoration
- Diagnostic functions
- Hardware Overview
- PLC communications and basic diagnostic functions.

CNC – SINUMERIK Solution Line

840Dsl Maintenance 2 w/ HMI Advanced

Course code: **SCT-SN84SM2A**

Target audience
This course is for maintenance personnel of CNC machines that utilize the SINUMERIK 840D / 810D controls, using the MMC-103 or PCU-50 Operator Interfaces. Personnel using the MMC-100.2 or HT-6 Operator Interfaces are urged to contact Siemens Customer Training prior to enrolling in this class.

Prerequisites
- 840Dpl Maintenance 1 w/HMI Advanced

Course Profile
This course provides a complete overview of the system hardware, software and configuration of the SINUMERIK 840D CNC, and its integrated SIMODRIVE 611D Digital Servo drive system. The course includes information regarding the hardware, configuration, and commissioning procedures for utilization of the SIMODRIVE 611D.

Objectives
Upon completion of this course, the student shall be able to:
- Back-up and restore all data to the MMC-103 / PCU-50, using Symantec GHOST software.
- Access and interpret the control's status displays for troubleshooting purposes.
- Analyze system messages, alarm messages, and LED indications to identify failures.
- Set and/or adjust specific machine data in the control.
- Optimize a closed loop position control system.

Topics
- Initialization of the control
- Initialization of the digital servo system
- System data back-up and restoration
- PLC User program back-up
- Interface signals and status display function
- Axis position control
- Spindle control
- Identifying OEM generated alarms and operator messages
- NC Auxiliary functions
- Identification and setting of 611-D module and motor data in the 840D
- Diagnosis of servo problems in the 840D

Machine Tool – Solution Line / HMI Advanced / HMI Operate

CNC – SINUMERIK Solution Line

840Dsl Maintenance 2 w/ Operate

Course code: **SCT-SNSLM2A-OP**

Target audience
This advanced maintenance course is designed for electrical/electronic end user maintenance personnel, and supporting manufacturing/ production engineers who wish to know more about the new SINUMERIK 840Dsl (Solution Line) CNC Controls.

Prerequisites
- MS Windows XP Expertise
- 840Dsl Maintenance 1 w/ Operate

Course Profile
This course includes information regarding system hardware, system software, configuration, and commissioning procedures related to both the 840Dsl and its integrated SINAMICS S-120 servo/spindle drive system. Course format is a mixture of lecture and hands-on exercises. SINUMERIK 840Dsl simulators are utilized to allow the student to build proficiency with the hardware and software systems.

Objectives
Upon completion of this course, the student shall be able to:
- Back-up and restore all NC data to the control
- Back-up and restore all PLC data
- Back-up and restore all PROFIBUS drive data
- Access and interpret control status displays for troubleshooting purposes
- Analyze system messages, alarm messages, and LED indications to identify failures
- Set and/or adjust machine data
- Optimize a closed loop position control system
- Perform practical start-up and servicing.

Topics
- Drive configuration and fundamentals of optimization
- Adaptation of control functions
- Start-up of compensations, synchronous actions, and axial coupling
- PLC Interface
- Axis position control
- Spindle control
- NC Auxiliary functions

4.5 Days | Register here | More information

CNC – SINUMERIK Solution Line

840Dsl Operations & Programming 1 w/HMI Operate

Course code: **SCT-SNSLP1A-OP**

Target audience
This course is for Operator/Programmers of CNC machines that utilize the new SINUMERIK 840Dsl (Solution Line) controls. This course presumes the customer is using the PCU 50.3 or an HMI TCU (Thin Client Unit), with the SINUMERIK Operate system platform.

Prerequisites
- MS Windows Expertise

Course Profile
This course provides a complete overview of the soft key menus of the SINUMERIK 840Dsl (Solution Line) controls, and describes the basic principles of operating the control. Demonstrations are given on how to manage part programs, define offsets, save and restore programs and control data.

Objectives
Upon completion of this course, the student shall be able to:
- Edit and store part programs in editing mode, using Siemens-installed editors.
- Back-up and restore work pieces, part programs, and control data to/from internal hard drive or the system CF Card.
- Back-up and restore work pieces, part programs, and control data to/from an external data medium.
- Use all Manual Mode operations.
- Use all MDI Mode operations.
- Use all Automatic Mode operations.
- Set and edit work offsets.
- Set and edit tool offsets.

Topics
- Program and subprogram directories.
- The Work piece directory.
- Editing subprograms and part programs.
- Saving programs to the hard disk.
- Saving work pieces and programs to an external data medium.
- Manual Mode operations.
- MDI Mode operations
- Automatic Mode operations.
- Parameter editing operations.

4.5 Days | Register here | More information

CNC – SINUMERIK Solution Line

840Dsl Safety Integrated for OEMs

Course code: **SCT-SNDSLI1A**

Target audience
German Course Code equivalent: NC-84SLSIW. This advanced course is designed for controls engineers and service specialists who configure and commission the SINUMERIK 840Dsl Safety Integrated (SI) functions in machine tool applications.

Prerequisites
- 840Dsl Maintenance 1 w/HMI Advanced
- 840Dsl Maintenance 2 w/HMI Advanced
- S7 TIA Programming 1
  OR
- 840Dsl Maintenance 1 w/Operate
- 840Dsl Maintenance 2 w/Operate
- S7 TIA Programming 1

Course Profile
During this course, the student will learn about configuring and commissioning the function Safety Integrated using the SINUMERIK 840Dsl.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concepts of safety technology and the system requirements for Safety Integrated.
- Have a working knowledge of safety-oriented inputs and outputs for PROFISafe Modules.
- Understand the principles related to safe communication over PROFINET and PROFIBUS.
- Commission, understand, and use SAFE Machine Data and interface signals related to Safety Integrated Inputs and Outputs.
- Commission Safety Integrated systems with SAFE SPL (Safe Programmable Logic)
- Commission Safe Operational Stop, Safe Standstill, Safe Velocity, and Safe Cams.
- Commission SAFE limits and understand the User Agreement and its implications.

Topics
- General information on safety technology; new standards
- Description of the safe basic functions
- Procedure during startup and troubleshooting
- Description of the machine data and interface signals

4.5 Days | Register here | More information

CNC – SINUMERIK Solution Line

840Dsl Safety Integrated Maintenance

Course code: **SCT-SNSLSM1A**

Target audience
This advanced course is designed for controls engineers and service specialists who use the SINUMERIK 840Dsl and Safety Integrated (SI) functions in machine tool applications.

Prerequisites
- 840Dsl Maintenance 2 w/ HMI Advanced AND
- S7 TIA Programming 1 OR
- 840Dsl Maintenance 2 w/ Operate

Course Profile
This course provides the knowledge and skills that controls engineers and/or maintenance technicians require for familiarization and the operation of an automated machine tool, equipped with a SINUMERIK 840Dsl CNC which uses the optional Safety Integrated System. The goal of the class is to teach the students to identify the various types of applications associated with the Safety Integrated System, to achieve a working knowledge of the concepts, and to identify and diagnose Safety Integrated related problems.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concepts of safety technology and the system requirements for Safety Integrated.
- Have a working knowledge of safety-oriented inputs and outputs for PROFISafe Modules.
- Understand the principles related to safe communication.
- Identify, understand, and use Machine Data and interface signals related to Safety Integrated applications.
- Perform error detection procedures
- Evaluate diagnostics and alarm displays

Topics
- Safety-oriented inputs and outputs
- Safe operational stop
- Securely reduced speed
- Safe software limit switches
- Safe programmable logic

CNC – SINUMERIK Solution Line

D Series Operations & Programming 1 w/ HMI Advanced

Course code: **SCT-SN84DP1B**

Target audience
This course is for Operator/Programmers of CNC machines that utilize the SINUMERIK 840D / 810D / 840Di controls, with MMC-103 or PCU-50 Operator Interfaces. Personnel who are using the MMC-100.2 or HT-6 Operator Interfaces are urged to contact Siemens Customer Training prior to enrolling in this class.

Prerequisites
- MS Windows Expertise

Course Profile
This course provides a complete overview of the softkey menus of the SINUMERIK D-series CNC and describes the basic principles of operating the control. Demonstrations are given on how to manage part programs, define offsets, and restore programs and control data.

Objectives
Upon completion of this course, the student shall be able to:
- Edit and store part programs in editing mode, using Siemens-installed editors.
- Back-up and restore workpieces, part programs, and control data to/from internal hard drive.
- Back-up and restore workpieces, part programs, and control data to/from an external data medium.

Topics
- Program management
- Program and subprogram directories
- The Workpiece directory
- Editing subprograms and part programs
- Saving programs to the hard disk
- Saving workpieces and programs to an external data medium

CNC – SINUMERIK Solution Line

D Series Operations & Programming 2 w/ HMI Advanced

Course code: **SCT-SN84DP2B**

Target audience
This course is for Programmers/Engineers who need an advanced understanding of the programming dialect used in the SINUMERIK 840D controls, with a PCU-50/70 Operating Interface.

Prerequisites
- D Series Operations & Programming 1 w/ HMI Advanced

Course Profile
The programming language of the control still retains G-codes, and in fact, can be programmed exclusively using the traditional G-code functions. However, the D-series controls (840D, 840Di, 810D) offer many additional preparatory commands and functions which are currently unique.

Objectives
Upon completion of this course, the student shall be able to:
- Write simple programs for standard machining operations.
- Explain the use of machining (canned) cycles.
- Describe how predefined subroutines and preparatory functions are used.
- Define essential terms
- Describe some of the more sophisticated programming functions

Topics
- Program definitions
- File management
- Contour definitions
- Variables and arguments
- Advanced functions

Drives & Motion – MASTERDRIVE / SINAMICS / SIMOTION

Learning Map

Core courses | Virtual instructor-led courses | Reinforcement

Foundation and Prerequisite training available from online quickSTEP, *Basics of AC and Basics of DC Drives*. Online Self-paced Training like *Machining: Siemens CNC* and *Electrical Safety & Arc Flash Awareness* courses. Visit www.usa.siemens.com/ospt for a complete list of course offerings..

SIMOTION Maintenance

SIMOTION System Maintenance — 4.5 DAYS — SCT-DVMSYM1A

SINAMICS 1st Responder Maintenance

SINAMICS G120 Basic Maintenance — 2.5 DAYS — SCT-DVG12M1A

SINAMICS S120 Basic Maintenance — 2.5 DAYS — SCT-DVS12M1A

MasterDrive

6SE70 CUMC Setup & Maintenance — 4.5 DAYS — SCT-DVS70M1B

6SE70 CUVC Setup & Maintenance — 4.5 DAYS — SCT-DVS70M1C

6RA70 DC Setup & Maintenance — 4.5 DAYS — SCT-DVR70M1A

SIMOTION Engineering

SIMOTION System Course — 4.5 DAYS — SCT-DVSMOM1A

SIMOTION System Programming — 4.5 DAYS — SCT-DVSMOP1A

SIMATIC Technology Controller — 4.5 DAYS — SCT-S7317P1A

SINAMICS Engineering and Maintenance

SINAMICS S Setup & Maintenance — 4.5 DAYS — SCT-DVSNAM1A

SINAMICS G120 Setup & Maintenance — 4.5 DAYS — SCT-DV120M1A

SINAMICS G150 Setup & Maintenance — 4.5 DAYS — SCT-DVSNGM1A

SINAMICS 6RA80 DCM Setup & Maintenance — 4.5 DAYS — SCT-DVDCMM1A

SINAMICS Certifications

SINAMICS G120 Certification — 2.5 DAYS — SCT-DVSNAG1A

SINAMICS S120 Certification — 2.5 DAYS — SCT-DVS12C1A

Drives – MASTERDRIVE

6RA70 DC Setup & Maintenance

Course code: **SCT-DVR70M1A**

Target audience
This course is for engineering and maintenance personnel responsible for installing, maintaining, and troubleshooting drive systems that utilize the 6RA70 DC Drive base unit.

Prerequisites
- Completion of the following quickSTEP online course: Basics of AC Drives

Course Profile
This course provides the knowledge and skills necessary to setup and maintain the operation of the 6RA70 "Base Unit." An analysis of the required hardware and the relationship between the various operational components is presented at the beginning of the course. Standard DC motor data and the relationship of this information as applied to the standard features of the drive is discussed.

Objectives
Upon completion of this course, the student shall be able to:
- Identify hardware configurations and verify required connections.
- Configure "base drive" logic and Self-Tune the drive for proper operation.
- Identify the use of the available fixed function and programmable analog & binary Inputs/Outputs.
- Troubleshoot the Armature and Field converters.
- Troubleshoot an invalid configuration of the drive by utilizing the MPU Board logic level prints.
- State the basic use and operation of the 6RA70 regulators.

Topics
- Introduction to LOW & LARGE HP Drive Hardware
- Power section connections and signal flow
- Parameter settings & logical grouping
- Motor data & related drive settings
- Base Drive initial setup requirements
- Self-Tuning capabilities
- Overview of MPU board logic diagrams
- Analog & Binary I/O configuration
- Analysis of "software" connectors
- (BICO Technology)

Drives – MASTERDRIVE

6SE70 CUMC Setup & Maintenance

Course code: **SCT-DVS70M1B**

Target audience
This course is for personnel responsible for installing, maintaining, and commissioning drive systems that utilize the CUMC basic and supplementary functions.

Prerequisites
- Completion of the following quickSTEP online course: Basics of AC Drives

Course Profile
This course provides training on the advantages of the motion control and apos - s innovative technology for easy installation, troubleshooting and diagnostics.

Objectives
Upon completion of this course, the student shall be able to:
- Configure logic and set-up the drive for proper operation.
- Identify the use of the available programmable analog & binary Inputs/ Outputs.
- Develop a logical and concise method of effectively troubleshooting indicated drive FAULTS and WARNINGS.
- Configure and operate the CUMC using "Simolink."
- State the basic function and/or use of the CUMC option boards.
- Identify hardware configurations and verify required connections.
- Use motor and drive data for proper initialization of the CUMC.

Topics
- Introduction to CUMC Drive Hardware
- Parameter settings
- Motor data & related drive settings
- Initial setup requirements
- Overview of MPU board logic diagrams
- Analog & Binary I/O configuration
- Interpretation of WARNING & FAULT codes
- Overview of the CUMC communication capabilities
- Overview of the CUMC OPTIONS

Drives – MASTERDRIVE

6SE70 CUVC Setup & Maintenance

Course code: **SCT-DVS70M1C**

Target audience
This course is for engineering and maintenance personnel responsible for installing, maintaining, and troubleshooting drive systems that utilize the 6SE70VC
AC Drive base unit.

Prerequisites
- Completion of the following quickSTEP online course: Basics of AC Drives

Course Profile
This course provides the knowledge and skills necessary to setup and maintain the operation of the 6SE70VC "Base Unit."

Objectives
Upon completion of this course, the student shall be able to:
- Configure "base drive" logic and Self-Tune the drive for proper operation.
- Identify the use of the available fixed function and programmable analog & binary Inputs/Outputs.
- Effectively troubleshoot an invalid configuration of the drive by utilizing the Function Diagrams; representing firmware logic level prints.
- Identify hardware configurations and verify required connections.
- State the basic use and operation of the 6SE70VC regulators.
- Develop a logical and concise method of effectively troubleshooting indicated drive FAULTS and WARNINGS.
- Configure and operate the 6SE70VC using the "USS" and SIMOLINK (Peer-to-Peer link) protocols.

Topics
- Introduction to available "Base Unit" Hardware
- Power section connections and signal flow
- Parameter settings & logical grouping
- Motor data & related drive settings
- Base Drive initial setup requirements
- Self-Tuning capabilities
- Analog & Binary I/O configuration
- Usage of CONTROL & STATUS words
- Converter and Inverter

Drives & Motion – MASTERDRIVE / SINAMICS / SIMOTION

Motion Control - SIMOTION

SIMOTION System Course

Course code: **SCT-DVSMOM1A**

Target audience
This course is for SIMOTION system developers and users who are responsible for creating, commissioning, or maintaining SIMOTION based motion control systems.

Prerequisites
- SINAMICS S Set up and Maintenance highly recommended

Course Profile
This course is intended to provide knowledge and skills related to SIMOTION systems as it pertains to commissioning, operation, configuration, maintenance, diagnostics, and troubleshooting. It is formatted as a combination of instruction and carefully structured, hands-on exercises. This course will utilize the D425-2 DP/PN motion control module and the SINAMICS servo drive controller for all exercises. The skills acquired will be portable to SIMOTION C-based and P-based controllers.

Objectives
Upon completion of this course, the student shall be able to:
- Locate modules, terminals, options, and features of the SIMOTION Controller and the SINAMICS S120 Drive
- Commission the SINAMICS servo controller for use with SIMOTION.
- Upload, back-up, and download projects to SIMOTION and SINAMICS
- Create, document, test, and troubleshoot a SIMOTION program.
- Create and monitor system variables.
- Interpret diagnostic codes and messages.

Topics
- SIMOTION and SINAMICS construction, options, and features
- Commissioning SINAMICS and SIMOTION
- SIMOTION Execution System
- Configuring axes - Drive optimization and SCOUT configuration
- Programming in MCC, Ladder, Structured Text
- Monitoring and Troubleshooting User Programs
- Communications and HMI
- Diagnostics and Troubleshooting
- Monitoring the system with IT DIAG

4.5 Days | Register here | More information

Motion Control - SIMOTION

SIMOTION System Maintenance

Course code: **SCT-DVMSYM1A**

Target audience
This course is for Maintenance Technicians and Site Engineers who are responsible for maintaining systems with Siemens motion based control systems including SIMOTION and SINAMICS S.

Prerequisites
- Siemens Online Self-paced Training, Automation: Siemens, 20 AC Motor Basics, 24 AC Drive Basics

Course Profile
This course is intended to provide knowledge and skills related to SIMOTION systems as it pertains to operation, maintenance, diagnostics, troubleshooting and repair. It is formatted as a combination of instruction and carefully structured, hands-on exercises. This course will utilize the D425-2 DP/PN motion control module and the SINAMICS servo drive controller for all exercises. The skills acquired will be portable to SIMOTION C-based and P-based controllers.

Objectives
Upon completion of this course, the student shall be able to:
- Locate modules, terminals, options, and features of the SIMOTION Controller and the SINAMICS S120 Drive
- Commission the SINAMICS servo controller for use with SIMOTION.
- Upload, back-up, and download projects to SIMOTION and SINAMICS
- Create, document, test, and troubleshoot a SIMOTION program.
- Create and monitor system variables.
- Interpret diagnostic codes and messages.

Topics
- SIMOTION and SINAMICS construction, options, and features
- Commissioning SINAMICS and SIMOTION
- SIMOTION Execution System
- Configuring axes - Drive optimization and SCOUT configuration
- Programming in MCC, Ladder, Structured Text
- Monitoring and Troubleshooting User Programs
- Communications and HMI
- Diagnostics and Troubleshooting
- Monitoring the system with IT DIAG

4.5 Days | Register here | More information

Motion Control - SIMOTION

SIMOTION System Programming

Course code: **SCT-DVSMOP1A**

Target audience
This course is for SIMOTION system developers and users who are responsible for creating, commissioning, or maintaining SIMOTION based motion control systems.

Prerequisites
- SIMOTION System Course

Course Profile
This course enables the participant to structure, generate and put in operation complex SIMOTION control program using MCC-charts and Structured Text. Examples of different applications user programs will be generated and ways of structuring programs will be shown. The focus lies on programming with Structured Text, Ladder and MCC.

Objectives
Upon completion of this course, the student shall be able to:
- Create programs in Structured Text, Ladder, and MCC
- Use commands for motion control within the user program
- Assign programs to execution system
- Create structures and subprograms (FC and FB)
- Use system functions
- Use function blocks of certain libraries
- Use variables and data structures
- Use tools for testing and diagnosis of the program

Topics
- System Design Functionality
- Programming
- Structured Text
- POS Axis Output CAM
- Gear CAM
- Libraries

4.5 Days | Register here | More information

Drives - SINAMICS, MASTERDRIVE

SINAMICS Drives Introduction

Course code: **SCT-DVSINM1A**

Target audience
This course is intended for personnel responsible for the long term maintenance and diagnostics of Siemens Drives. It is intended as the entry level SINAMICS drive course and provides the foundation for SINAMICS G120 and S120 Drives setup and maintenance classes.

Prerequisites
- Basic Computer Skills
- Basic Industrial Electricity / Electronics experience
- Competent in safe use of common electrical test tools such as VOM, DMM, oscilloscope, etc.

Course Profile
This course provides a basic review of electrical and electronics principles pertaining to industrial applications and develops skills pertinent to variable frequency drives. It also provides an introduction to SINAMICS drives and SINAMICS STARTER commissioning software.
It is formatted as a combination of instruction and carefully structured, hands-on exercises aimed at developing job-related knowledge and skills.

Objectives
Upon completion of this course, the student shall be able to:
- Operate and Test Drive Functionality via Operator Panels
- Perform Basic Drive Set Up and Hardware Commissioning
- Get Connected to a Drive with STARTER Commissioning Software
- Operate and Test Drive Functionality via STARTER Control Panel

Topics
- Basic Electricity for industry review
- Introduction to Motor Construction and Operating Principles
- Introduction to AC Drives
- Drive Safety
- Introduction to SINAMICS Low Voltage Drives
- SINAMICS drive basic Setup/commissioning
- Utilizing Operator Panels
- Introduction to SINAMICS STARTER

Drives - SINAMICS, MASTERDRIVE

SINAMIC S 6RA80 DCM Setup & Maintenance

Course code: **SCT-DVDCMM1A**

Target audience
This course is for engineering and maintenance personnel responsible for installing, maintaining, and troubleshooting drive systems that utilize the 6RA80 SINAMICS DC MASTER or DCM Control Module.

Course Profile
This course is intended to provide knowledge and skills related to the 6RA80 SINAMICS DC MASTER or DCM Control Module as it pertains to commissioning, operation, configuration, maintenance, diagnostics, and troubleshooting. It is formatted as a combination of instruction and carefully structured, hands-on exercises aimed at developing job-related knowledge and skills.

Objectives
Upon completion of this course, the student shall be able to:
- Locate modules, terminals, options, and features of the SINAMICS DC MASTER Converter
- Perform commissioning using the BOP20 and AOP30 operator panels and SINAMICS STARTER
- Perform all required Drive optimizations
- Upload, back-up, and download projects to the Drive system
- Firmware Upgrade/Downgrade
- Compare and analyze parameter files
- Configure Analog, Digital, and Comm. I/O
- Configure, Trace, and Evaluate BICO connections in the drive control logic
- Configure common Drive Functions
- Evaluate drive system performance using the trace function
- Evaluate operating states, alarms and fault codes

Topics
- DCM Drive construction, options, and features
- SINAMICS STARTER
- Commissioning
- DCM Drive Functions
- Diagnostics and Troubleshooting
- Maintenance and Repair
- Integration into an Automation System
- Peer to Peer Interfaces
- Drive Control Chart (DCC)

Drives - SINAMICS, MASTERDRIVE

SINAMICS G130/G150 Setup & Maintenance

Course code: **SCT-DVSNGM1A**

Target audience
This course is for engineering and maintenance personnel responsible for installing, maintaining, and troubleshooting drive systems that utilize the SINAMICS G130/G150 Drive.

Prerequisites
- IPOV Online Courses, 20 AC Motor Basics, 24 AC Drive Basics

Course Profile
This course is intended to provide knowledge and skills related to the SINAMICS G130/G150 drive as it pertains to commissioning, operation, configuration, maintenance, diagnostics, and troubleshooting. It is formatted as a combination of instruction and carefully structured, hands-on exercises aimed at developing job-related knowledge and skills.

Objectives
Upon completion of this course, the student shall be able to:
- Locate modules, terminals, options, and features of the SINAMICS G130/G150.
- Commission the Drive with AOP30 and SINAMICS STARTER
- Perform all required Drive optimizations
- Take local control of a drive using the AOP30 and the STARTER Control Panel
- Upload, back-up, and download projects to the Drive system
- Firmware Upgrade/Downgrade
- Compare and analyze parameter files
- Configure Analog, Digital, and Comm. I/O
- Configure, Trace, and Evaluate BICO connections in the drive control logic
- Configure common Drive Functions
- Evaluate drive system performance using the trace function
- Evaluate operating states, alarms and fault codes

Topics
- Drive construction, options, and features
- SINAMICS STARTER
- Commissioning
- Drive Functions
- Diagnostics and Troubleshooting
- Maintenance and Repair
- Integration into an Automation System

– MASTERDRIVE / SINAMICS / SIMOTION

Drives - SINAMICS / MASTERDRIVE

SINAMICS G120 Basic Maintenance

Course code: **SCT-DVG12M1A**

Target audience
This course is intended for personnel responsible for the long term maintenance and diagnostics of the Siemens Drive.

Prerequisites
- Completion of the following quickSTEP online course: Basics of AC Drives

Objectives
Upon completion of this course, the student shall be able to:
- Trace voltage waveform from Input rectifier to Motor output.
- Utilize G120 Architecture to troubleshoot Hardware Modules
- Troubleshoot the Power Electronics
- Operate the Drive via IOP Keys
- Perform Basic Commissioning and Set Up via IOP
- Backup and Restore the Operating Program via Memory Card and IOP
- Establish communication with STARTER
- Upload, Archive, and Restore G120 Configuration via STARTER
- Control Drive via STARTER Control Panel
- Trace Signals within the G120 configuration utilizing BICO technology
- Troubleshoot Drive failure to respond to a Command Source and Setpoint Channel Source
- Use the Diagnostic Fault and Warning Buffer to troubleshoot the system
- Troubleshoot Regulation (speed or torque) problems
- Install or Replace a Motor, Power Module and Control Unit
- Replace a Cooling Fan
- Obtain technical support online or via hotline

Topics
- Safety, PPE, and ESD
- Perform Hardware Module Diagnostics
- Set up and Operate the G120 via Intelligent Operator Panel (IOP)
- Back-up and restore operating program via IOP and Memory Card
- Utilize STARTER software to Upload, Archive and Restore G120 Project
- Troubleshoot a SINAMICS drive system using STARTER application diagnostics
- Evaluate Drive System Performance
- Replace Defective Hardware

2.5 DAYS | Register here | More information

Drives - SINAMICS / MASTERDRIVE

SINAMICS S120 Basic Maintenance

Course code: **SCT-DVS12M1A**

Target audience
This course is intended for personnel responsible for the long term maintenance and diagnostics of the Siemens Drive.

Prerequisites
- Completion of the following quickSTEP online course: Basics of AC Drives

Objectives
Upon completion of this course, the student shall be able to:
- Trace voltage waveform from Input rectifier to Motor output.
- Utilize S120 Architecture to troubleshoot Hardware Modules
- Troubleshoot the Power Electronics
- Operate the Drive via AOP30
- Perform Basic Commissioning and Set Up with AOP30
- Save the Operating Program to Memory Card
- Establish communication with STARTER
- Upload, Archive, and Restore S120 Configuration via STARTER
- Control Drive via STARTER Control Panel
- Trace Signals within the S120 configuration utilizing BICO technology
- Troubleshoot Drive failure to respond to a Command Source and Setpoint Channel Source
- Use the Diagnostic Fault and Warning Buffer to troubleshoot the system
- Troubleshoot Regulation (speed or torque) problems
- Install or Replace a Motor, Power Module, and Control Unit
- Replace a Cooling Fan
- Obtain technical support online or via hotline

Topics
- Safety, PPE, and ESD
- Perform Hardware Module Diagnostics
- Set up and Operate the S120 via AOP30
- Save operating program to Memory Card via AOP30
- Utilize STARTER software to Upload, Archive and Restore S120 Project
- Troubleshoot a SINAMICS drive system using STARTER application diagnostics
- Evaluate Drive System Performance
- Replace Defective Hardware
- Obtain technical support

2.5 DAYS | Register here | More information

Drives - SINAMICS, MASTERDRIVE

SINAMICS S Setup & Maintenance

Course code: **SCT-DVSNAM1A**

Target audience
This course is for engineering and maintenance personnel responsible for installing, maintaining and troubleshooting drive systems that use the SINAMICS S (S110, S120, S150) drive systems.

Prerequisites
- Siemens Online Self-paced Training, Automation: Siemens, 20 AC Motor Basics, 24 AC Drive Basics

Course Profile
This course is intended to provide knowledge and skills related to the SINAMICS S drive as it pertains to commissioning, operation, configuration, maintenance, diagnostics, and troubleshooting. It is formatted as a combination of instruction and carefully structured, hands-on exercises aimed at developing job-related knowledge and skills.

Objectives
Upon completion of this course, the student shall be able to:
- Locate modules, terminals, options, and features on the SINAMICS S series drives.
- Commission the Drive with SINAMICS STARTER
- Perform all required Drive optimizations
- Take local control of a drive using the STARTER Control Panel
- Upload, back-up, and download projects to the Drive system
- Firmware Upgrade/Downgrade
- Configure Analog, Digital, and Comm. I/O
- Configure, Trace, and Evaluate BICO connections in the drive control logic
- Configure common Drive Functions
- Evaluate drive system performance using the trace function
- Evaluate operating states, alarms and fault codes

Topics
- Drive construction, options, and features
- SINAMICS STARTER
- Commissioning
- Drive Functions
- Diagnostics and Troubleshooting
- Maintenance and Repair
- Integration into an Automation System
- Drive Control Chart (DCC)
- Technology Functions

4.5 Days | Register here | More information

Drives - SINAMICS, MASTERDRIVE

SINAMICS G120 Setup & Maintenance

Course code: **SCT- DV120M1A**

Target audience
This course is for engineering and maintenance personnel responsible for installing, maintaining and troubleshooting drive systems that use the SINAMICS G120 series AC drives.

Prerequisites
- Siemens Online Self-paced Training, Automation: Siemens, 20 AC Motor Basics, 24 AC Drive Basics

Course Profile
This course is intended to provide knowledge and skills related to the SINAMICS G120 as it pertains to commissioning, operation, configuration, maintenance, diagnostics, and troubleshooting. It is formatted as a combination of instruction and carefully structured, hands-on exercises aimed at developing job-related knowledge and skills.

Objectives
Upon completion of this course, the student shall be able to:
- Locate modules, terminals, options, and features of the SINAMICS G120 series drives.
- Commission the Drive with Operator Panels (IOP, BOP-2) and SINAMICS STARTER
- Perform all required Drive optimizations
- Take local control of a drive using Operator Panels and the STARTER Control Panel
- Upload, back-up, and download projects to the Drive system
- Configure Analog, Digital, and Comm. I/O
- Configure, Trace, and Evaluate BICO connections in the drive control logic
- Configure common Drive Functions
- Evaluate drive system performance using the trace function
- Evaluate operating states, alarms and fault codes

Topics
- Drive construction, options, and features
- SINAMICS STARTER
- Commissioning
- Drive Functions
- Diagnostics and Troubleshooting
- Maintenance and Repair
- Integration into an Automation System
- Technology Functions

Drives & Motion - SINAMICS GH180 – Perfect Harmony Medium Voltage Drives

Learning Map

Core courses | Virtual instructor-led courses | Optional learning

Foundation and Prerequisite training available from online quickSTEP, *Basics of AC and Basics of DC Drives*. Visit www.usa.siemens.com/ospt for a complete list of course offerings..

GH180 Air Cooled - Operations

Drives – Air Cooled Operations — 4 HOURS

LDA-LDNGAOT1

GH180 Air Cooled - Orientation

Drives – Air Cooled Orientation — 8 HOURS

LDA-LDNGADO1

GH180 Air Cooled - Advanced

Drives – Air Cooled Operations — 4 DAYS

LDA-LDNGAS1B

GH180 Liquid Cooled - Operations

Drives – Liquid Cooled Operations — 4 HOURS

LDA-LDNGLOT1

GH180 Liquid Cooled - Orientation

Drives – Liquid Cooled Orientation — 8 HOURS

LDA-LDNGLDO1

GH180 Liquid Cooled - Advanced

Drives – Liquid Cooled Operations — 4 DAYS

LDA-LDNGLS1C

Legacy Air/Liquid - Advanced

Drives – Air/Liquid Cooled Operation Maintenance and Repair — 4 DAYS

LDA-LDLALS1A

Next Generation WC2 - Advanced

Drives – Liquid Cooled Operation Maintenance and Repair — 4 DAYS

LDA-LDNGLS1B

Next Generation HV - Advanced

Drives – Liquid Cooled Operation Maintenance and Repair — 4.5 DAYS

LDA-LDHVGE1A

SOP – Advanced

SOP – System Operations Program Setup and Operations — 2 DAYS

LDA-LDSOPE1A

Cell Certification

Power Cells Certification — 10 DAYS

LDA-CRCERE1A

Drive Certification

Drive Air/Liquid Cooled Certification — 20 DAYS

LDA-LDPHAC1A

Drives - SINAMICS GH 180 Perfect Harmony

Drive Operator Training – NXG and NXGPro Controls

Course code: **LDA-LDNGAOT1**

Target audience
This is a 4 hour training session to allow your personnel to obtain an understanding of how the drive operates, and monitoring capabilities. The Equipment Safety issues will be covered. This course is intended for Operations personnel or site personnel to gain an understanding on the operations of the VFD. This session will be on the Siemens SINAMICS GH 180 Perfect Harmony Air Cooled Next Generation control drives.

Prerequisites
- Understanding Safety requirements of your facility.

Course Profile
This training session includes general Theory of how the VFD works, Safety with regards to the VFD, and operation of the VFD in manual and automatic control. Also covered will be the Keypad for monitoring of dynamics of the VFD operation and Alarms and Faults.

Objectives
Upon completion of this course, the student shall be able to:
- Have a general understanding on how the SINAMICS GH 180 Perfect Harmony functions
- Understand the Safety concerns when working around the VFD.
- How to utilize the keypad for basic programming. (accel/decel rates, min/max speed) and monitoring (speed demand, speed feedback, motor voltage and motor current)
- Identify customers permissive ½s required for the VFD to operate.

Topics
- Introduction to the SINAMICS GH 180 Perfect Harmony Air Cooled drive
- Safety on medium voltage drives - Personnel Protective equipment, correct procedure for applying and shutting power off the VFD.
- Control Door options -for operation - Switches and pushbuttons and functionality
- Operation of the Harmony Drive in the Automatic and Manual mode
- Utilization of the Keypad for programming key parameters and viewing Alarm/Fault Logger

4 Hours | Register here | More information

Drives - SINAMICS GH 180 Perfect Harmony

Drive Orientation Training – NXG and NXGPro Controls

Course code: **LDA-LDNGADO1**

Target audience
This is a one day drive orientation allowing personnel to obtain an understanding of what the drive is and how it works. All power connections and safety issues will be covered.

Prerequisites
- Operation fundamentals of non VFD equipment and your process, as well as, electrical operation and safety.

Course Profile
This course will cover the following topics, Theory of Operation, Safety variables related to the VFD, Hardware Identification, Power Supply sources required to run the VFD, Operation of the VFD, General review of the Keypad, Alarms and Faults, Spare Parts, and the Cooling System ½ Air Cooled

Objectives
Upon completion of this course, the student shall be able to:
- Have a good understanding on how the SINAMICS GH 180 Perfect Harmony functions
- Understand the Safety concerns when working around the VFD.
- Identify each cabinet and power components with in each cabinet.
- Identify each power sources required for the VFD to operate via customer drawings
- Identify all customers permissives required for the VFD to operate.
- Navigate through customer schematics -power and control connections.
- Operate the VFD in the Automatic or Manual mode of operation.

Topics
- Introduction to Air Cooled System
- Introduction to the SINAMICS GH 180 Perfect Harmony Legacy Control
- Specifications of the VFD
- Safety on medium voltage drives
- Drive Hardware Identification
- Control Door controls
- Operation of the Harmony Drive in the Automatic and Manual mode
- Using the Keypad
- Key parameters
- Review Alarm/Fault Logger
- Tool Suite Demonstration only

8 Hours | Register here | More information

Drives - SINAMICS GH 180 Perfect Harmony

Drive Operation, Maintenance and Repair Training NXG and NXGPro Controls (Gen3, Gen3E, Gen4, Gen 4E)

Course code: **LDA-LDNGAS1B**

Target audience
This is a task-based course intended for maintenance and electrical personnel, as well as electrical engineers using Siemens SINAMICS GH 180 Perfect Harmony Next Generation Control drives. The course builds confidence in personnel who want to understand how the drive works and how to operate the drive safely.

Prerequisites
- PC with administrative rights required.
- Strong fundamental electrical background

Course Profile
This course is intended to provide knowledge and skills which include Theory of Operation, details of components, troubleshooting, interface and hands-on tasks. It is formatted to provide both instructional and hands on tasks utilized in maintaining, analyzing and troubleshooting the VFD.

This course is an advanced session covering each aspect of the VFD (variable frequency drive) in detail, as well as, advanced troubleshooting procedures. The format is a combination of 25% instruction and 75% hands-on learning aimed at developing job-related knowledge and skills. Hands on is with an actual SINAMICS GH 180 Perfect Harmony VFD, simulators, and power cells.

Topics
- Course overview and expectations
- Introduction to SINAMICS GH 180 Perfect Harmony Next Generation drives Air Cooled
- Basics of VFD's and Motors
- Specifications
- Safety on medium voltage drives
- Power Electronics
- Drive Hardware Identification
- SINAMICS GH 180 Perfect Harmony Topology (theory, layout, operation)
- Key Parameters utilized in the VFD
- Tool Suite software - install, navigate, program
- Configuration software

4 Days | Register here | More information

Drives & Motion - SINAMICS GH180 – Perfect Harmony Medium Voltage Drives

Drives - SINAMICS GH 180 Perfect Harmony

Drive Operator Training – NXG and NXGPro Controls

Course code: **LDA-LDNGLOT1**

Target audience
This is a 4 hour training session to allow your personnel to obtain an understanding of how the drive operates, and monitoring capabilities. Equipment Safety issues will be covered.

Course Profile
This training session includes general Theory of how the VFD works, Safety with regards to the VFD, and operation of the VFD in manual and automatic control. Also covered will be the Keypad for monitoring of dynamics of the VFD operation and Alarms and Faults. The Cooling system monitoring capabilities will be discussed which consist of the pump and key sensing devices.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the Safety concerns when working around the VFD.
- How to utilize the keypad for basic programming. (accel/decel rates, min/max speed) and monitoring (speed demand, speed feedback, motor voltage and motor current)
- Identify customers permissive ½s required for the VFD to operate.
- Operating the VFD in the Automatic and Manual mode of operation.
- Understanding the Cooling Cabinet and recognize when additional water is required, and when the conductivity is high and replacing the deionizer tank

Topics
- Introduction to the SINAMICS GH 180 Perfect Harmony Liquid Cooled drive
- Safety on medium voltage drives - Personnel Protective equipment, correct procedure for applying and shutting power off the VFD.
- Control Door options -for operation - Switches and pushbuttons and functionality
- Operation of the Harmony Drive in the Automatic and Manual mode
- Utilization of the Keypad and key parameters
- Reviewing Alarm/Fault Logger
- Cooling cabinet monitoring capabilities and operation

Drives - SINAMICS GH 180 Perfect Harmony

Drive Orientation – NXG and NXGPro Controls

Course code: **LDA-LDNGLDO1**

Target audience
This is a one day drive orientation allowing personnel to obtain an understanding of what the drive is and how it works. All power connections and safety issues will be covered. This course is intended for maintenance and electrical personnel, as well as, electrical engineers using Siemens SINAMICS GH 180 Perfect Harmony Liquid Cooled Next Generation control drives.

Prerequisites
- Operation fundamentals of non VFD equipment and your process, as well as, electrical operation and safety.

Course Profile
This course will cover the following topics, Theory of Operation, Safety variables related to the VFD, Hardware Identification, Power Supply sources required to run the VFD, Operation of the VFD, General review of the Keypad, Alarms and Faults, Spare Parts, and the Cooling System ½ Liquid Cooled

Objectives
Upon completion of this course, the student shall be able to:
- Understand the Safety concerns when working around the VFD.
- Identify each cabinet and power components within each cabinet.
- Identify each power sources required for the VFD to operate via customer drawings
- Identify all customers permissives required for the VFD to operate.
- Navigate through customer schematics -power and control connections.
- Operate the VFD in the Automatic or Manual mode of operation.

Topics
- Introduction to Liquid Cooled System
- Introduction to the SINAMICS GH 180 Perfect Harmony Legacy Control
- Specifications
- Safety on medium voltage drives
- Drive Hardware Identification
- Control Door Controls
- Operation of the Harmony Drive in the Automatic and Manual mode

Drives - SINAMICS GH 180 Perfect Harmony

NXG and NXGPro Controls – WC3/Base Drive

Course code: **LDA-LDNGLS1C**

Target audience
This course is intended for maintenance and electrical personnel, as well as, electrical engineers using Siemens SINAMICS GH 180 Perfect Harmony Legacy Control drives (both Air and Liquid-Cooled designs).

Prerequisites
- Strong fundamental electrical background

Course Profile
This training session includes Theory of Operation, details of components, troubleshooting, interface and hands-on sessions. This is an advanced session which covers each aspect of the VFD (variable frequency drive) in detail, as well as, advanced troubleshooting procedures.

Objectives
Upon completion of this course, the student shall be able to:
- •Understand how the SINAMICS GH 180 Perfect Harmony functions and correct implementation at your facility.
- Learn how to work with personal protective equipment while working safely on the VFD.
- Identify full components per assembly and schematics.
- Understand how each control board functions.
- Understand how a power cell functions.
- Check power semiconductors with an analog meter.
- Utilize the keypad for monitoring and programming.

Topics
- Introduction to Liquid Cooled Drive System
- Introduction to SINAMICS GH 180 Perfect Harmony Next Generation drives
- Fundamental Terminology used with VFD's
- Motor Theory
- Safety on medium/High voltage drives
- Power Devices
- Harmony Topology (operation, layout, theory)
- Drive Hardware Identification
- Theory of operation on the various control boards (NXG1A, NXG1B, NXG2)
- Review schematics and assembly drawings
- Operation of the Harmony Drive
- Review drawings and requirements for plumbing systems
- Presentation of Siemens software, Utilization of Tool Suite software package

Drives - SINAMICS GH 180 Perfect Harmony

Legacy Control Air/Liquid-Cooled

Course code: **LDA-LDLALS1A**

Target audience
This course is intended for maintenance and electrical personnel, as well as, electrical engineers using Siemens SINAMICS GH 180 Perfect Harmony Legacy Control drives (both Air and Liquid-Cooled designs).

Prerequisites
- Strong fundamental electrical background

Course Profile
This training session includes Theory of Operation, details of components, trouble-shooting, interface and hands-on sessions.

Objectives
Upon completion of this course, the student shall be able to:
- Understand how the SINAMICS GH 180 Perfect Harmony functions and correct implementation at your facility.
- Learn how to work with personal protective equipment while working safely on the VFD.
- Identify full components per assembly and schematics.
- Check power semiconductors with an analog meter
- Utilize the keypad for monitoring and programming.
- Use a laptop to extract valuable information which can be utilized for troubleshooting, and backing up the original files. Parameters, EEPROM, SOP, historic, and fault logger.

Topics
- Introduction to Air and Liquid Cooled Drives Systems
- Introduction to the SINAMICS GH 180 Perfect Harmony Legacy Control
- Specifications
- Fundamental Terminology used with VFD's
- Motor Theory
- Safety on medium voltage drives
- Power Devices
- Harmony Topology (operation, layout, theory)
- Drive Hardware Identification
- Theory of operation on the various control boards (Legacy Control Boards)
- Review schematics and assembly drawings
- Operation of the Harmony Drive
- Review drawings and requirements for plumbing systems and blower assemblies.

4 Days | Register here | More information

Drives - SINAMICS GH 180 Perfect Harmony

Next Generation Control Liquid-Cooled WCII

Course code: **LDA-LDNGLS1B**

Target audience
This course is intended for maintenance and electrical personnel, as well as, electrical engineers using Siemens SINAMICS GH 180 Perfect Harmony Legacy Control drives (both Air and Liquid-Cooled designs).

Prerequisites
- Strong fundamental electrical background

Course Profile
This training session includes Theory of Operation, details of components, troubleshooting, interface and hands-on sessions. This is an advanced session which covers each aspect of the VFD (variable frequency drive) in detail, as well as, advanced troubleshooting procedures.

Objectives
Upon completion of this course, the student shall be able to:
- Understand how the SINAMICS GH 180 Perfect Harmony functions and correct implementation at your facility.
- Learn how to work with personal protective equipment while working safely on the VFD.
- Identify full components per assembly and schematics.
- Understand how each control board functions
- Understand how a power cell functions
- Check power semiconductors with an analog meter
- Utilize the keypad for monitoring and programming.
- Use a laptop to communicate to the VFD to perform programming and viewing parameters; viewing status of VFD; power cells, digital and analog I/O; graphical display of key variables; uploading parameters, event, historic, and fault logger.

Topics
- Introduction to Liquid Cooled Drive Systems
- Introduction to SINAMICS GH 180 Perfect Harmony Next Generation drives
- Specifications
- Fundamental Terminology used with VFD's
- Motor Theory
- Safety on medium voltage drives
- Power Devices
- Harmony Topology (operation, layout, theory)
- Drive Hardware Identification
- Theory of operation on the various control boards (NXG1A, NXG1B)

4 Days | Register here | More information

Drives - SINAMICS GH 180 Perfect Harmony

Next Generation Control Liquid Cooled High Voltage

Course code: **LDA-LDHVGE1A**

Target audience
This course is intended for maintenance and electrical personnel, as well as, electrical engineers using Siemens SINAMICS GH 180 Perfect Harmony Legacy Control drives (both Air and Liquid-Cooled designs).

Prerequisites
- Strong fundamental electrical background

Course Profile
This training session includes Theory of Operation, details of components, troubleshooting, interface and hands-on sessions. This is an advanced session which covers each aspect of the VFD (variable frequency drive) in detail, as well as, advanced troubleshooting procedures

Objectives
Upon completion of this course, the student shall be able to:
- Understand how the SINAMICS GH 180 Perfect Harmony functions and correct implementation at the facility.
- Learn how to work with personal protective equipment while working safely on the VFD.
- Identify full components per assembly and schematics.
- Understand how each control board functions
- Understand how a power cell functions (High Voltage).

Topics
- Introduction to Liquid Cooled Drive System
- Introduction to SINAMICS GH 180 Perfect Harmony Next Generation drives
- Specifications
- Fundamental Terminology used with VFD's
- Motor Theory
- Safety on medium/High voltage drives
- Power Devices
- Harmony Topology (operation, layout, theory)
- Drive Hardware Identification
- Theory of operation on the various control boards (NXG1A, NXG1B, NXG2)
- Review schematics and assembly drawings
- Operation of the Harmony Drive
- Review drawings and requirements for plumbing systems
- Presentation of Siemens software, Utilization of Tool Suite software package
- Maintenance, Troubleshooting, Installation, and Setup

4.5 Days | Register here | More information

Drives & Motion - SINAMICS GH180 – Perfect Harmony Medium Voltage Drives

Drives - SINAMICS GH 180 Perfect Harmony

SOP – System Operational Program

Course code: **LDA-LDSOPE1A**

Target audience
This session is for personnel to obtain an understanding of all functions that control the Variable Frequency Drive (VFD), as well as, feedbacks from the VFD. The course is a two day session covering the System Operational Program (SOP) - the program which controls all functions of the VFD. The Tool Suite Software will be provided. This includes Drives Host and the Debug Tool.

Course Profile
This course provides the knowledge and skills necessary to review and evaluate the System Operational Program (SOP). By understanding the SOP the learner will understand which per missives are required for the drive to run in the automatic or manual control - where the speed commands come from and how they are directed. The student will also understand the assignments of the digital inputs and outputs - as well as, the assignments of all analog inputs. Additional logic within the SOP will also be addressed.

Objectives
Upon completion of this course, the student shall be able to:
- Read the entire System Operational Program.
- Understand how the jobsite SOP functions with relationship to the jobsite drawings.
- Understand system flags utilized in the SOP (see Topics).
- Modify the SOP to meet specific customer requirements.

Topics
- Introduction to the SINAMICS GH 180 Perfect Harmony Drive System
- Customer schematics
- Drive flowcharts
- Symbol definitions
- Breakdown of flags utilized in SOP
- Drive flags - initialization flags
- Counters
- Menu timers
- SOP timers
- Digital Inputs to Wago or Breakout Board
- Digital Outputs from Wago or Breakout Board
- Drive Faults
- User Alarms/Faults
- Start/Stop logic

Drives - SINAMICS GH 180 Perfect Harmony

Cell Repair Certification

Course code: **LDA-CRCERE1A**

Target audience
Siemens Repair Depot centers

Prerequisites
- ***Siemens Employee***

Course Profile
This is a certification session on the repair of Air Cooled power cells.
This course is intended to provide knowledge and skills which include theory of operation, details of components, troubleshooting, interface and hands-on tasks to repair Air Cooled power cells.
It is formatted to provide both instructional and hands on tasks utilized in evaluating, analyzing, repairing and testing the Air Cooled Cells – Gen 3, Gen 3E, Gen 4.

Objectives
Upon completion of this course, the student shall be able to:
- Obtain understanding of Siemens repair procedures
- Analyze each style of power cell for defects and update enhancements
- Interpret power cell drawings (assembly and schematics)
- Dis-assemble each power cell effectively and efficiently
- Replace components per Siemens guidelines
- Assemble each power cell effectively and efficiently
- Test power cells with new power cell station

Topics
- Course overview and expectations
- Requirements of repair depot center
- Introduction to power cell certification program
- Basics of SINAMICS GH 180 Perfect Harmony drive and power cells
- Power cell power electronics
- Power cells (operation, layout, theory of operation)
- Safety and PPE
- Power cell assembly and schematics drawings
- Procedure for Power Cells (tools, dis-assembly, replacement, assembly, testing)
- Certification exam

Drives - SINAMICS GH 180 Perfect Harmony

SINAMICS GH 180 Perfect Harmony Drive Certification

Course code: **LDA-LDPHAC1A**

Target audience
This course is intended for Siemens field service personnel. This course is a certification on Siemens SINAMICS GH 180 Perfect Harmony Next Generation and Legacy control Air and Liquid cooled VFD's.

Prerequisites
- ***Siemens Field Service Representative***

Course Profile
This comprehensive certification training session includes Theory of Operation, details of components, troubleshooting, interface and hands-on sessions. This is four week session which covers various Harmony VFD's (variable frequency drives) in detail, as well as, advanced troubleshooting procedures. Various software packages will be provided to the associate's to load on their computers.

Objectives
Upon completion of this course, the student shall be able to:
- Understand how the SINAMICS GH 180 Perfect Harmony functions and correct implementation at customer's facilities.
- Learn how to work with personal protective equipment while working safely on the VFD.
- Identify full components per assembly and schematics.
- Check power semiconductors with an analog meter
- Utilize the keypad for monitoring and programing.
- Use a laptop to communicate to the VFD to perform programming and viewing parameters; viewing status of VFD; power cells, digital and analog I/O; graphical display of key variables; uploading parameters, event, historic, and fault logger.
- Interpret customer on-site drawings of the VFD system (assembly and schematics)
- Recommend and correctly install spare parts.
- Understand the Liquid cooled cabinet, components and function ability
- HMI interface on the control cabinet
- HMI -Unitronics monitoring of the cooling sensors

SITRAIN courses focus on plant floor safety

Electrical Maintenance & Safety

Learning Map

Core courses | Virtual instructor-led courses | Optional learning

Health and Safety Catalog Siemens now offers an entire online self-paced catalog of courses dedicated to safety. Partnered with Underwriters Laboratory, over 150 interactive titles are available along with our 400 unique technology courses. www.usa.siemens.com/ospt.

Electrical Maintenance

Electrical Maintenance — 4 DAYS
SCT-EMEMTM1A

Evaluating Electrical Tests — 4 DAYS
SCT-EMEETM1A

Electrical Safety

PCS7 System Operator (Virtual Instructor-led) — 8 HOURS
SCT-EMOILESOM1A

Electrical Safety: NFPA 70E Arc Flash Training — 0.5 DAY
SCT-ERISESAT

OSHA Electrical Safety & Arc Flash — 2 DAYS
SCT-EMESOM1A

Risk Assessment Management — 1.5 DAYS
SCT-MSRAMG1A

Switchgear & Breakers

Industrial Switchgear Maintenance — 5 DAYS
SCT-EMISGM1A

RL Switchgear Maintenance — 4 DAYS
SCT-EMRLSM1A

WL Switchgear Maintenance — 2 DAYS
SCT-EMWLBM1A

GM Switchgear Maintenance — 4 DAYS
SCT-EMGMSM1A

Optional and specialty courses:

Course name	Course code	Duration
840Dpl Safety Integrated Maintenance	SCT-SNSSIM2A	4.5 days
840Dsl Safety Integrated for OEMs	SCT-SNDSLI1A	4.5 days
840Dsl Safety Integrated Maintenance	SCT-SNSLSM1A	4.5 days
Electrical Safety: Non Qualified Workers	SCT-SMAXELEC	0.5 days
Electrical Safety: Qualified Workers	SCT-ERISESQW	0.5 days
Lockout Tagout: Take Control	SCT-CLLOTMPG	0.5 days
S7-300F Distributed Safety Engineering	SCT-S7SFTE1A	2.5 days
S7-300F Distributed Safety Sustaining	SCT-S7SFTS1A	2 days

Maintenance & Safety

840Dpl Safety Integrated Maintenance

Course code: **SCT-SNSSIM2A**

Target audience
This advanced course is designed for controls engineers and service specialists who use the SINUMERIK 840D and Safety Integrated (SI) functions in machine tool applications.

Prerequisites
- 840Dpl Maintenance 2 w/HMI Advanced

Course Profile
This course provides the knowledge and skills that controls engineers and/or maintenance technicians require for familiarization and the operation of an automated machine tool, equipped with a SINUMERIK 840D CNC which uses the optional Safety Integrated System.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concepts of safety technology and the system requirements for Safety Integrated.
- Have a working knowledge of safety-oriented inputs and outputs for DMP Modules.
- Have a working knowledge of safety-oriented inputs and outputs for PROFISafe Modules.
- Understand the principles related to safe communication.
- Identify, understand, and use Machine Data and interface signals related to Safety Integrated applications.
- Perform error detection procedures related to Safety Integrated applications.
- Evaluate diagnostics and alarm displays
- Understand and perform Test Stop procedures.
- Understand Safety Integrated systems with SAFE SPL and without SAFE SPL.

Topics
- Safety-oriented inputs and outputs
- Safe Standstill
- Safe operational stop
- Securely reduced speed
- Safe software limit switches
- Safe stopping process
- Safe programmable logic
- Safety related Machine Data
- Understand OEM safety related alarms
- Understand checksums

Maintenance & Safety

840Dsl Safety Integrated for OEMs

Course code: **SCT-SNDSLI1A**

Target audience
German Course Code equivalent: NC-84SLSIW.
This advanced course is designed for controls engineers and service specialists who configure and commission the SINUMERIK 840Dsl Safety Integrated (SI) functions in machine tool applications.

Prerequisites
- 840Dsl Maintenance 1 w/HMI Advanced
- 840Dsl Maintenance 2 w/HMI Advanced
- S7 TIA Programming 1

OR
- 840Dsl Maintenance 1 w/Operate
- 840Dsl Maintenance 2 w/Operate

Course Profile
During this course, the student will learn about configuring and commissioning the function Safety Integrated using the SINUMERIK 840Dsl.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concepts of safety technology and the system requirements for Safety Integrated.
- Have a working knowledge of safety-oriented inputs and outputs for PROFISafe Modules.
- Understand the principles related to safe communication over PROFINET and PROFIBUS.
- Commission, understand, and use SAFE Machine Data and interface signals.
- Commission Safety Integrated systems with SAFE SPL (Safe Programmable Logic)
- Commission Safe Operational Stop, Safe Standstill, Safe Velocity, and Safe Cams.
- Commission SAFE limits and understand the User Agreement and its implications.

Topics
- System requirements
- General information on safety technology
- Description of the safe basic functions
- Procedure during startup and troubleshooting
- Description of the machine data and interface signals

Maintenance & Safety

840Dsl Safety Integrated Maintenance

Course code: **SCT-SNSLSM1A**

Target audience
This advanced course is designed for controls engineers and service specialists who use the SINUMERIK 840Dsl and Safety Integrated (SI) functions in machine tool applications.

Prerequisites
- 840Dsl Maintenance 2 w/ HMI Advanced
- S7 TIA Programming 1 OR 840Dsl Maintenance 2 w/ Operate

Course Profile
This course provides the knowledge and skills that controls engineers and/or maintenance technicians require for familiarization and the operation of an automated machine tool, equipped with a SINUMERIK 840Dsl CNC which uses the optional Safety Integrated System. The goal of the class is to teach the students to identify the various types of applications associated with the Safety Integrated System, to achieve a working knowledge of the concepts, and to identify and diagnose Safety Integrated related problems.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concepts of safety technology and the system requirements for Safety Integrated.
- Have a working knowledge of safety-oriented inputs and outputs for PROFISafe Modules.
- Understand the principles related to safe communication.
- Identify, understand, and use Machine Data and interface signals related to Safety Integrated applications.
- Perform error detection procedures
- Evaluate diagnostics and alarm displays

Topics
- Safety-oriented inputs and outputs
- Safe Standstill
- Safe operational stop
- Securely reduced speed
- Safe software limit switches
- Safe stopping process

Electrical Maintenance & Safety

Maintenance & Safety

Electrical Maintenance

Course code: **SCT-EMEMTM1A**

Target audience
This course is for Maintenance electricians and technicians, supervisors and people in the process of cross training from non-electrical trades.

Course Profile
This course is designed to increase knowledge in the areas of basic electrical theory and the preventive maintenance of many types of electrical equipment. The typical voltage range of equipment covered is 480V to 15kV.

Objectives
Upon completion of this course, the student shall be able to:
- Identify Various Power Distribution System Arrangements.
- Explain Techniques for Evaluating Insulation Tests.
- Solve Electrical Maintenance Problems Using Basic Mathematics.
- Determine preventive Maintenance Procedures for Many Types of Electrical Equipment.
- Identify Governmental Safety Regulations
- Describe Safe Work Practices

Topics
- Power System Fundamentals
- and Documentation
- Electrical Tests
- Fundamental Principles of Power System Equipment
- Equipment Maintenance
- Fundamentals of Power System Analysis
- Electrical Safety

4 Days | Register here | More information

Maintenance & Safety

Electrical Safety: NFPA 70E Arc Flash Training

Course code: **SCT-ERISESAT**

Target audience
Anyone whose job requires them to work on or near high voltage energized electrical parts.

Course Profile
This course presents a true story of an electrical worker who received 2nd and 3rd degree burns over 40 percent of his body and was nearly killed when he was engulfed in an arc blast. Learners see the mistakes made and learn the lifesaving lessons from this incident. 14 interactions actively involve the learner to stress the importance of understanding all hazards of a job task and taking the necessary precautions to protect yourself from them.

Objectives
Upon completion of this course, the student shall be able to:
- Be committed to your own personal safety.
- List causes of Mark's accident and injuries.
- Agree that following safe work practices is your own responsibility.
- Dress safely when working with electricity.
- List unsafe items to wear when working with electricity.
- Agree that flame-resistant clothing is a regulation and requirement for anyone working with electricity.
- Conduct an arc flash hazard analysis.
- Explain ways to determine the Incident Energy Level.
- Define the Arc Flash Boundary.
- Differentiate between the four Hazard Categories.
- Select the approved Personal Protective Equipment for each Hazard Category.

Topics
- Personal Responsibility
- Avoiding Injury
- Flame Resistant clothing (FR)
- Arc Flash Hazard Analysis
- Incident Energy Level
- Arc Flash Protection Boundary
- Hazard Risk Categories
- Hazard Risk Category Zero
- Hazard Risk Category One
- Hazard Risk Category Two
- Hazard Risk Categories Three and Four

0.5 DAYS | Register here | More information

Maintenance & Safety

Electrical Safety: Non Qualified Workers

Course code: **SCT-SMAXELEC**

Target audience
All persons who work with machinery and equipment either on or off the job.

Course Profile
Employees need to know how electricity works, and what they should do to protect themselves from its hazards. This course provides the information employees need to work safely around electricity. The Course also satisfies the OSHA training requirements under 29 CFR Part 1910.331 for non-qualified workers.

Objectives
Upon completion of this course, the student shall be able to:
- Describe how electricity works.
- Distinguish between volts and amps.
- Describe how the flow of electricity works.
- Describe the function of circuit breakers and fuses.
- Describe the function of a fuse.
- Describe the function of a circuit breaker.
- State how fuses and circuit breakers are rated.
- Describe function of ground wires and GFCIs.
- Define GFCI.
- Define ground wire.
- Describe the function of a ground wire.
- Define a grounded outlet.
- Use safe work practices when working with electricity.
- State the dangers most commonly associated with electricity.
- Identify unsafe work practices that should be avoided.
- Describe the function of double-insulated tools.
- Work safely with electrical equipment.

Topics
- How Electricity Works
- Fuses and Circuit Breakers
- Grounding and GFCIs
- Safe Work Practices
- Working With Electrical Equipment
- Dangerous Work Environments
- Electrical Emergencies

0.5 DAYS | Register here | More information

Maintenance & Safety

Electrical Safety: Qualified Workers

Course code: **SCT-ERISESQW**

Target audience
Anyone whose job requires them to work on or near energized electrical parts.

Course Profile
This course presents the training requirements and safe work practices for qualified workers as outlined in OSHA 1910 Subpart (S). The training features several incidents involving electricity in which unsafe acts by employees have resulted in serious injury or death. Topics include qualified worker status, electrical arcing and arc blasts, protective clothing requirements for qualified workers, limited approach and prohibited approach boundaries, use of voltage-rated gloves and other PPE, performing live work and de-energizing equipment.

Objectives
Upon completion of this course, the student shall be able to:
- Recognize someone qualified to work on or near live parts.
- Agree that a worker may be qualified for some electrical work and not qualified for other electrical work.
- Differentiate between a qualified and non-qualified worker.
- List the two types of hazards associated with electricity.
- Avoid injury when working with electricity.
- Agree that a minimum safe distance for unqualified workers varies depending on voltage level and circuits.
- Define minimum safe distance.
- Explain how minimum safe distance is determined.
- Protect yourself against electric hazards.
- List the two main types of electric hazards.
- Explain an arc blast.
- Describe ways to protect yourself against burns.
- Always use the required protective clothing and equipment.

Topics
- The Qualified Worker
- Avoiding Injury
- Hazards
- Protective Equipment
- Additional Safety Measures

0.5 DAYS | Register here | More information

Maintenance & Safety

Evaluating Electrical Tests

Course code: **SCT-EMEETM1A**

Target audience
This course is recommended for technicians, maintenance engineers and maintenance planners who have the responsibility to evaluate the electrical tests of motors, generators, transformers, switchgear and power cables of an industrial plant or a commercial building. This course is valuable whether you perform tests yourself or evaluate the test data that is supplied by a testing contractor.

Course Profile
The Evaluating Electrical Tests Seminar explains the interpretation of those electrical tests that are most frequently performed on power system apparatus. Emphasis is on the evaluation of test data. The techniques for performing tests are briefly explained to provide background information.

The opportunity to work through classroom exercises that are based on actual-case scenarios in a “teamwork” setting sharpens the evaluation skills of every participant.

Objectives
Upon completion of this course, the student shall be able to:
- Describe Various Methods of Electrical Testing.
- Interpret Electrical Test Results.
- Predict Expected Operational Equipment Life More Accurately.
- Apply Fundamental Concepts of Electrical Testing to Actual Equipment.
- Select Recommended Testing Procedures for New Equipment.
- Practice Safe Work Practices and Procedures When Performing Electrical Testing.

Topics
- Fundamentals of Electrical Measurements
- Evaluating Insulation Tests
- Evaluating Applied-Potential Tests
- Evaluating Circuit Resistance Tests
- Evaluating Overcurrent Tests
- Fundamentals of Cable Fault Localization

4 Days | Register here | More information

Maintenance & Safety

Industrial Switchgear Maintenance

Course code: **SCT-EMISGM1A**

Target audience
Personnel responsible for the daily operation and maintenance of Medium and Low Voltage Switchgear and Motor Control.

Course Profile
The Industrial Switchgear and Motor Control course provides the basic skills required to safely operate and maintain Medium Voltage switchgear, Low Voltage Switchgear, Medium Voltage Control and Low Voltage Motor Control Centers. Classroom instruction, video tapes, and demonstrations on typical equipment are employed. Sample circuit breakers are used for troubleshooting and replacement of typical parts.

Objectives
Upon completion of this course, the student shall be able to:
- Perform proper safety procedures
- Identify MV & LV switchgear and its ratings
- Identify MV & LV motor control and its ratings
- Identify Insulated case circuit breaker ratings
- Identify Molded case circuit breaker ratings
- Proper and safe racking procedure
- Perform Rack out - Lock out - Tag out procedure
- Verify operation of protective interlocks
- Perform Mechanical and Electrical operation
- Locate and replace close and trip coils and motor
- Interpret Siemens schematics and wiring diagrams

Topics
- Safety procedures around Electrical Equipment
- Introduction to Switchgear Ratings
- Handling, storage and assembly
- Circuit breaker and Motor control ratings
- Cable and control wiring connections
- PT and CPT units
- Current Transformer safety
- Circuit breaker racking procedures
- Rack out, Lock out, tag out procedures
- Explanation of Vacuum Interruption
- Disassembly for maintenance
- Replacing Trip coil, closing coil, and charging motor
- Lubrication
- Insulation testing (Megger)
- Dielectric testing (High Potential)

5 DAYS | Register here | More information

Electrical Maintenance & Safety

Maintenance & Safety

Lockout Tagout: Take Control

Course code: **SCT-CLLOTMPG**

Target audience
All workers.

Course Profile
This course teaches your workers proper lockout/tagout procedures, why the procedures are important, how and when to use them, and how to safely restart the equipment or machinery. Twenty-four interactions help bring the course content to life and reliably assess your workers understanding of the material.

Objectives
Upon completion of this course, the student shall be able to:
- Explain the elements of a lockout tagout program.
- State the purpose of Lockout Tagout.
- Explain why locks are used.
- List the information contained on tags.
- Differentiate between authorized and affected employees.
- Agree that both authorized and affected employees are involved in the lockout tagout program.
- Recognize hazardous energy sources.
- List forms of hazardous energy.
- Recognize possible results of uncontrolled energy.
- Control hazardous energy.
- Select examples of energy-isolating devices.
- Agree to adhere to one lock and key per employee.
- Agree to never share or exchange locks and keys.
- Explain the purpose of tags.
- Explain why tags should be difficult to remove.
- Perform effective lockout tagout procedures.
- Assemble the proper order of all lockout tagout steps.
- Agree that only trained, authorized employees should perform lockout tagout.
- Identify questions to ask before starting work on equipment.

Topics
- The Lockout/Tagout Program
- Hazardous Energy
- Lockout/Tagout Procedures
- Start-Up Procedures

0.5 DAYS | Register here | More information

Maintenance & Safety

OSHA Electrical Safety & Arc Flash

Course code: **SCT-EMESOM1A**

Target audience
This course is designed for anyone specifically cited in paragraph 1910.332 of CFR 29. Included are supervisors of personnel, engineers, technicians, electricians and others facing a higher than normal risk of electrical accidents.

Course Profile
The Electrical Safety and OSHA Requirements Seminar reviews the principles, governmental regulations, work practices and specialized equipment relating to electrical safety. Demonstrations of lockout/tagout and personal protective equipment are provided. CFR 1910 Subpart S Electrical, CFR 1910 Subpart R Electrical Power Generation, Transmission and Distribution and NFPA 70E Standard for Electrical Safety 2009 Edition, Personal and other Protective Equipment are incorporated into this program.

Objectives
Upon completion of this course, the student shall be able to:
- Explain Governmental Regulations for Safe Work Practices and Procedures.
- Review the Required Procedures for Locking, Tagging and Grounding of Electrical Equipment.
- Define elements of an Approved Safety Program.
- Apply Appropriate Safe Work Practices and Procedures when Working in Confined Spaces.
- Determine the Flash Protection Boundary.
- Assess the applicable Hazard/Risk category and select proper Personal Protective Equipment.

Topics
- Electrical Safety Practices
- Working Safely in Electrical Switchgear
- Working Safely with Power Transformers
- Arc Flash Hazards

2 Days | Register here | More information

Maintenance & Safety

S7-300F Distributed Safety Engineering

Course code: **SCT-S7SFTE1A**

Target audience
This course is for engineers and personnel responsible for implementing SIMATIC Distributed Safety systems, including:
- Selecting the appropriate architecture
- Selecting the components and understanding their specific purposes and limitations
- Specifying the module and system wiring
- Developing the safety PLC program
- Starting up and supporting the system.

Prerequisites
- MS Windows Expertise
- AB-S7 Fastrack OR S7 Automation Maintenance 1 OR S7 TIA Programming 1

Course Profile
This course introduces the student to a Siemens Distributed Safety PLC application. Participants receive knowledge on applying the system per relevant standards, Failsafe Hardware Module details and parameterization, Safety Program structure and implementation, Safety Communications, System Diagnostics and introduction to Drive Safety.

Objectives
Upon completion of this course, the student shall be able to:
- Locate and understand the applicability of the detailed documentation and development resources
- Select and configure the Failsafe Hardware components, and understand their application restrictions.
- Properly implement a Safety program in the PLC.
- Document, test, and troubleshoot the system.

Topics
- Introduction to Distributed Safety
- Standards discussion
- Hardware introduction and safety wiring
- STEP 7 quick tour
- STEP 7 Distributed Safety overview and labs
- Reintegration
- Safety Logic
- System Communication overview
- Diagnostics
- Throughput Calculations

2.5 DAYS | Register here | More information

Maintenance & Safety

S7-300F Distributed Safety Sustaining

Course code: **SCT-S7SFTS1A**

Target audience
This course is for SIMATIC S7 300F PLC users who install or maintain automation safety systems and their application programs.

Prerequisites
- MS Windows Expertise
- S7 TIA Programming 1 OR
- S7 Automation Maintenance 1

Course Profile
This course introduces the student to a Siemens Distributed Safety PLC application. Participants will build skills on commissioning, troubleshooting and upgrading an automation safety system. Failsafe Hardware Module details and parameterization, Safety Program structure and implementation, and System Diagnostics are covered.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the concept of the Siemens S7 safety integrated system.
- Identify S7 safety components.
- Know how to remove and replace S7-300 and ET200S safety components.
- Identify the wiring diagrams of the S7-300 and ET200S safety components.
- Understand the hardware configuration of the S7-300 safety components.
- Identify the LED diagnostics for the S7-300 safety components.
- Identify the addressing of the S7-300 safety components.
- Troubleshooting using the Hardware Configuration diagnostics to identify system faults.

Topics
- Safety Systems Overview
- Introduction to Standard & Safety Block Structure
- S7 Safety CPU and ET200S Hardware
- Safety PLC Hardware Configuration
- Safety Project Overview
- Safety Program Code
- Testing and Diagnostics

Maintenance & Safety

WL Low Voltage Switchgear Maintenance

Course code: **SCT-EMWLBM1A**

Target audience
For personnel involved in installation, operation, maintenance or testing of Siemens Type WL low voltage switchgear with Electronic Trip Units (ETU).

Course Profile
Proper methods for installing the equipment to assure satisfactory service and typical operations such as racking, charging, closing and tripping are explained as well as how to respond should the breaker trip. Typical maintenance and parts replacement are covered.

Features and benefits of the electronic trip units and expansion modules are explained and methods for setting the trip units using front panel controls or by connection to a PC are covered.

Objectives
Upon completion of this course, the student shall be able to:
- Identify Siemens WL low voltage switchgear
- Understand the installation requirements for satisfactory service
- Properly rack, charge, close and trip the WL circuit breaker
- Determine the appropriate response to a breaker trip condition
- Perform typical maintenance
- Read and adjust settings on the Electronic Trip Unit using front panel or electronic means
- Recognize the safety features of the lockouts provided and how to use them
- Replace an electronic trip unit, charging motor, closing coil or trip coil
- Perform field testing of the circuit breaker
- Interpret Siemens drawings related to the WL switchgear line

Topics
- Introduction to Type WL Low Voltage Switchgear
- Cubicle Structure and Components
- Circuit Breaker Components
- Cubicle and Circuit Breaker as a Unit
- ETU Protective Device
- Maintenance
- Parts Replacement

Virtual Instructor-led Training

OSHA Electrical Safety and Arc Flash

Course code: **SCT-EMOILESOM1A**

Target audience
This course is designed for anyone specifically cited in paragraph 1910.332 of CFR 29. Included are supervisors of personnel, engineers, technicians, electricians and others facing a higher than normal risk of electrical accidents.

Course Profile
The Electrical Safety and OSHA Requirements Seminar reviews the principles, governmental regulations, work practices and specialized equipment relating to electrical safety. Demonstrations of lockout/tagout and personal protective equipment are provided.

CFR 1910 Subpart S Electrical, CFR 1910 Subpart R Electrical Power Generation, Transmission and Distribution and NFPA 70E Standard for Electrical Safety 2015 Edition, Personal and other Protective Equipment are incorporated into this program.

Objectives
Upon completion of this course, the student shall be able to:
- Explain Governmental Regulations for Safe Work Practices and Procedures.
- Review the Required Procedures for Locking, Tagging and Grounding of Electrical Equipment.
- Define elements of an Approved Safety Program.
- Apply Appropriate Safe Work Practices and
- Procedures when Working in Confined Spaces.
- Determine the Flash Protection Boundary.
- Assess the applicable Hazard/Risk category and select proper Personal Protective Equipment.

Topics
- Electrical Safety Practices
- Working Safely in Electrical Switchgear
- Working Safely with Power Transformers
- Arc Flash Hazards

Electrical Maintenance & Safety

Maintenance & Safety

Risk Assessment Management

Course code: **SCT-MSRAMG1A**

Target audience
This course is for users who are involved with developing or sustaining machine safety automation systems and their application programs.

Prerequisites
- Basic knowledge of machine safety standards
- MS Windows Expertise

Course Profile
The objective of this course is to methodically, transparently and comprehensibly present the process of risk assessment as a necessary step in analyzing hazards before risk mitigation. Participants will be introduced to the risk evaluation method outlined in ANSI B11.0 2010 with the aid of pre-completed templates and a real example. Throughout this course students will work on identifying different hazards, defining machine limits, assessment of the original risk, risk reduction techniques, documentation requirements and exercises based on practical examples.

Objectives
Upon completion of this course, the student shall be able to:
- Understanding the Risk Assessment process.
- Identify different hazards during the Risk Assessment process.
- Understand ways of creating customized Risk Assessment templates
- Do a practical implementation of Risk Assessment
- Understand the documentation requirements for Risk assessment.
- Look into conducting a standard-compliant Risk assessment implementation.

Topics
- Introduction to Machine Safety
- Overview of Machine Safety Standards
- What is a Risk Assessment
- Differences - Risk Assessment
- Understanding the Risk Assessment Process
- Types of Risk Reduction
- Benefits of Risk assessment
- Instructor led Risk Assessment
- Exercise based on practical example
- Discussion

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Power Systems & SIMOCODE

Learning Map

Core courses | Virtual instructor-led courses | Optional learning

Foundation and Prerequisite training courses are available for beginners in the form of our online, self-paced courses. Our Technology catalog offers general and Siemens-specific titles including Intro to PLC's, Siemens PLC Programming concepts, and Function Block for Siemens PLC's. Visit www.usa.siemens.com/ospt for a complete list of course offerings.

Power Monitoring & Maintenance

ACCESS/WinPM.net — 3 DAYS

SCT-PSACCE1A

SIMOCODE

SIMOCODE Pro Motor Management — 2 DAYS

SCT-SCSIMG1A

Optional and specialty courses:

Course name	Course code	Duration
Industrial Switchgear Maintenance	SCT-EMISGM1A	5 days
WL Low Voltage Switchgear Maintenance	SCT-EMWLBM1A	2 days

Power & Controls

ACCESS/WinPM.net

Course code: **SCT-PSACCE1A**

Target audience
This course is intended for individuals who require a detailed introduction to and understanding of how to use and administer ACCESS intelligent devices and the WinPM. Net software package. It is expected that the students of this course have some experience with Siemens ACCESS Power Meters and the WinPM.Net software package.

Course Profile
The Siemens SITRAIN Training Center offers a variety of courses taught by a dedicated team of Siemens training professionals in an environment that promotes quick, efficient learning and encourages active class participation. Our US ACCESS headquarters is located in Norcross, GA., a suburb of Atlanta. Our courses provide an interactive "hands-on" learning environment demonstrating real world scenarios. Each student is provided a personal workstation to use connected through an Ethernet LAN to a range of Siemens ACCESS advanced digital devices. This 3-day course provides hands-on, introductory training for our ACCESS power meters and for the WinPM.Net software system.

Objectives
Upon completion of this course, the student shall be able to:
- Identify the primary applications, features, and advantages of the entire Siemens meter product range.
- Configure meters using their front panel interfaces and through WinPM.Net software.
- Understand the features and functions of the various WinPM.Net software components.
- Enable security features, manage user accounts and assign control privileges.
- Use and configure the analog and/or digital inputs and outputs of Siemens ACCESS meters.
- Install WinPM.Net software for each type of workstation configuration.
- Establish communication to Siemens
- ACCESS meters using a variety of communication options.
- Generate reports

3 Days | Register here | More information

Power & Controls

Industrial Switchgear Maintenance

Course code: **SCT-EMISGM1A**

Target audience
Personnel responsible for the daily operation and maintenance of Medium and Low Voltage Switchgear and Motor Control.

Course Profile
The Industrial Switchgear and Motor Control course provides the basic skills required to safely operate and maintain Medium Voltage switchgear, Low Voltage Switchgear, Medium Voltage Control and Low Voltage Motor Control Centers. Classroom instruction, video tapes, and demonstrations on typical equipment are employed. Sample circuit breakers are used for troubleshooting and replacement of typical parts.

Objectives
Upon completion of this course, the student shall be able to:
- Perform proper safety procedures
- Identify MV & LV switchgear and its ratings
- Identify MV & LV motor control and its ratings
- Identify Insulated case circuit breaker ratings
- Identify Molded case circuit breaker ratings
- Proper and safe racking procedure
- Perform Rack out - Lock out - Tag out procedure
- Verify operation of protective interlocks
- Perform Mechanical and Electrical operation
- Locate and replace close and trip coils and motor
- Interpret Siemens schematics and wiring diagrams

Topics
- Safety procedures around Electrical Equipment
- Introduction to Switchgear Ratings
- Handling, storage and assembly
- Circuit breaker and Motor control ratings
- Cable and control wiring connections
- PT and CPT units
- Current Transformer safety
- Circuit breaker racking procedures
- Rack out, Lock out, tag out procedures
- Explanation of Vacuum Interruption
- Disassembly for maintenance
- Replacing Trip coil, closing coil, and charging motor
- Lubrication
- Insulation testing (Megger)
- Dielectric testing (High Potential)

5 DAYS | Register here | More information

Power & Controls

SIMOCODE Pro Motor Management System

Course code: **SCT-SCSIMG1A**

Target audience
This course is intended for SIMOCODE Pro Motor Management System users who are involved with implementation, start-up, operation or maintenance of systems containing the SIMOCODE Pro.

Course Profile
This course introduces the SIMOCODE Pro Motor Management System and its components. Using representative hardware, the student will configure and operate the system. Unit controls allow the student to experience the reaction of the SIMOCODE Pro to over-current, undervoltage or over temperature. SIMOCODE ES software is used to configure the system for operation of a reversing motor and modification of the controls to adapt to user and apos - s requirements.

Objectives
Upon completion of this course, the student shall be able to:
- Configure the SIMOCODE Pro for use as any particular motor starter.
- Set the SIMOCODE Pro to match the motor parameters.
- Modify the SIMOCODE program as required.
- Wire the Inputs, Outputs and Control Power.
- Recognize fault indications and how to reset them.
- Upload/Download the SIMOCODE program.
- Use Diagnostic functions in SIMOCODE ES.
- Replace a SIMOCODE device.
- Install SIMOCODE program.
- Set the SIMOCODE communication address using the addressing plug.
- Integrate SIMOCODE ES into the Step 7 environment.

Topics
- Response to Fault Conditions
- Device Configuration
- Protection
- Monitoring Functions
- Inputs/Outputs
- Additional Function Blocks
- Diagnostics
- Communications

2 Days | Register here | More information

Power Systems & SIMOCODE

Power & Controls

WL Low Voltage Switchgear Maintenance

Course code: **SCT-EMWLBM1A**

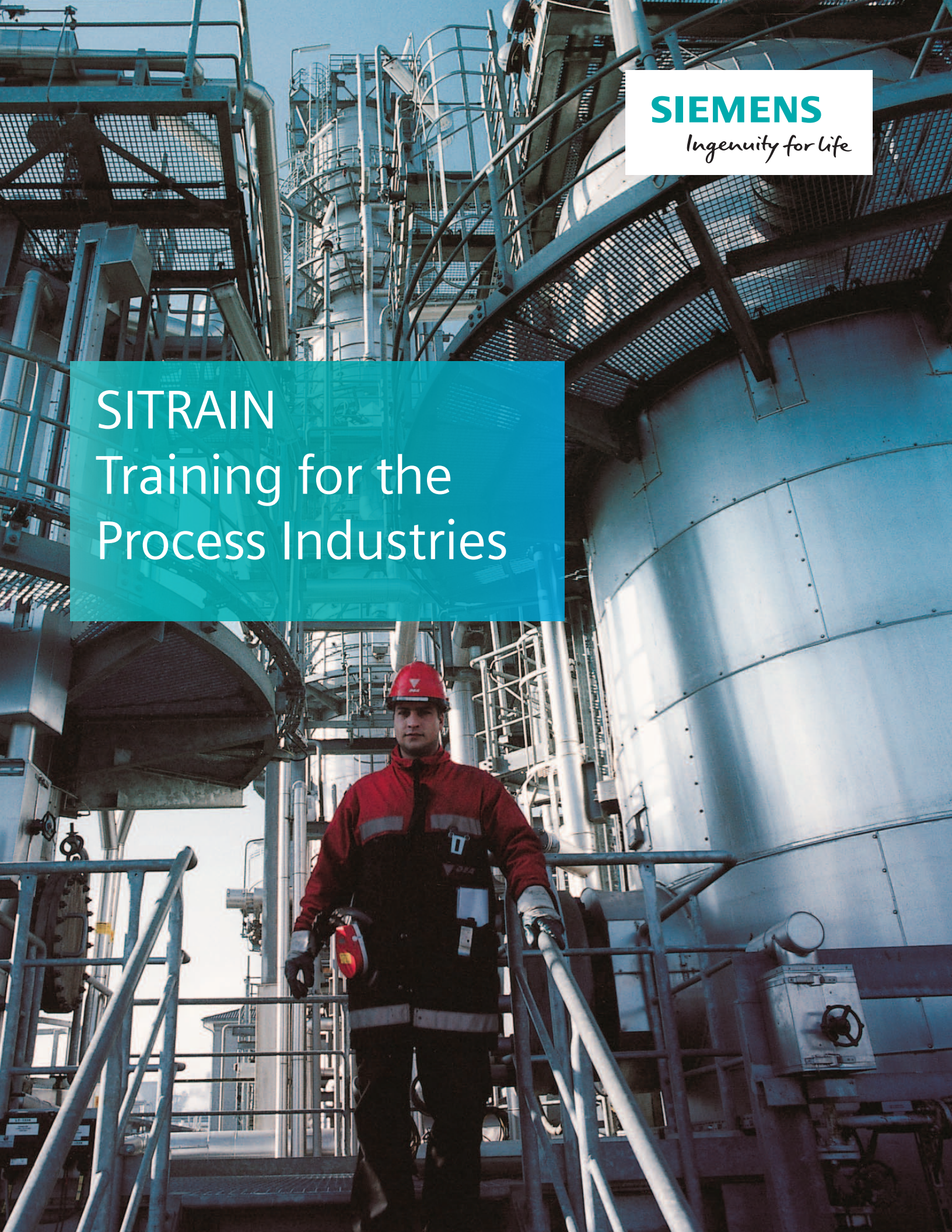
Target audience
For personnel involved in installation, operation, maintenance or testing of Siemens Type WL low voltage switchgear with Electronic Trip Units (ETU).

Course Profile
Proper methods for installing the equipment to assure satisfactory service and typical operations such as racking, charging, closing and tripping are explained as well as how to respond should the breaker trip. Typical maintenance and parts replacement are covered.

Features and benefits of the electronic trip units and expansion modules are explained and methods for setting the trip units using front panel controls or by connection to a PC are covered.

Objectives
Upon completion of this course, the student shall be able to:
- Identify Siemens WL low voltage switchgear
- Understand the installation requirements for satisfactory service
- Properly rack, charge, close and trip the WL circuit breaker
- Determine the appropriate response to a breaker trip condition
- Perform typical maintenance
- Read and adjust settings on the Electronic Trip Unit using front panel or electronic means
- Recognize the safety features of the lockouts provided and how to use them
- Replace an electronic trip unit, charging motor, closing coil or trip coil
- Perform field testing of the circuit breaker
- Interpret Siemens drawings related to the WL switchgear line

Topics
- Introduction to Type WL Low Voltage Switchgear
- Cubicle Structure and Components
- Circuit Breaker Components
- Cubicle and Circuit Breaker as a Unit
- ETU Protective Device
- Maintenance
- Parts Replacement



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SITRAIN
Training for the Process Industries

Process Analyzers

Learning Map

Core courses | Virtual instructor-led courses | Optional learning

Maxum Learning Map

Introduction to Process Gas Chromatography (Virtual Instructor-led) — 10 HOURS
PIA-PAOILOPTIA1

Online Refresher Maxum Operation with GCP Level 1 — 2 HOURS
PIA-PAMAXGCP1-RA1

Maxum Application Courses

Maxum HRVOC Operations & Maintenance — 4.5 DAYS
PIA-PAMAXHRV

Process Gas Chromatography Technology — 3 DAYS
PIA-PAOPTIA1

Maxum HRVOC Operations & Maintenance — 3 DAYS
PIA-PAMAXHR3

Maxum Operations with GC Portal Level 1 — 4.5 DAYS
PIA-PAMAXGCP1

MicroSAM Maintenance — 3 DAYS
PIA-PAMSAMS1

Total Sulfur Application Vapor Samples (Virtual Instructor-led) — 15 HOURS
PIA-PAOILMAXTSA

Maxum Operations with GC Portal Level 2 — 4.5 DAYS
PIA-PAMAXGCP2

Maxum MaxBasic Software Development — 4.5 DAYS
PIA-PAMAXUM3

Maxum Simulated Distillation — 1 DAY
PIA-PAMAXUM8

Maxum Analyzer Networks — 4.5 DAYS
PIA-PAMAXUM5

Maxum Gas Chromatograph Portal Workshop — 2 DAYS
PIA-PAMAXGCPWS

Continuous Gas Analyzer Courses

ULTRAMAT

ULTRAMAT 6 Service & Repair — 1 DAY
PIA-PACONAC2

OXYMAT

OXYMAT 6 Service & Repair — 1 DAY
PIA-PACONAC3

FIDAMAT

FIDAMAT 6 Service & Repair — 1 DAY
PIA-PACONAC4

NOXMAT

NOXMAT 6 Service & Repair — 1 DAY
PIA-PACONAC5

CEMS

CEMS System Overview — 3 DAYS
PIA-PACONAC1

CEMS includes Ultramat 6, Oxymat 6 and Noxmat 6

ULTRAMAT

ULTRAMAT 23 Service & Repair — 1 DAY
PIA-PACGAC23

Laser

LDS-6 LASER 6 Operations & Maintenance — 1 DAY
PIA-PACGLDS6

Process Analyzers

CEMS System Overview

Course code: **PIA-PACONAC1**

Target audience
This overview course is intended for individuals responsible for the operation and calibration of Siemens Continuous Analyzers as well as CEMS systems.

Course Profile
This course covers maintenance and calibration of the Siemens Continuous Monitoring Analyzers Systems. This course covers hardware and software associated with each analyzer - Ultramat 6, Oxymat 6 and Noxmat 6. This course also covers sample systems associated with each analyzer and sample system with continuous emissions monitoring. Siemens Monitors and generic data collection systems are covered.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate Ultramat 6, Oxymat 6 and Noxmat 6 analyzers
- Replace the primary modules in these analyzers and the CEMS sample system.
- Perform a bench alignment on the Ultramat 6
- Set parameters in the 6 series analyzers thru the HMI.
- Clean the detector cells

Topics
- Sample Systems
  - Disassembly & Assembly
  - Speed Loops
  - Gas sample probe
- Sample gas cooler
  - Condensation Outlet
  - Operation & Adjustments
- Liquid membrane separator
- Condensation monitors
  - Balston coalescing filters
- ULTRAMAT
  - Cell Cleaning and Maintenance
  - Pneumatic Pump
  - Electronic Board Identification
  - Infrared Analysis
- OXYMAT
  - Bench Disassembly
  - Analyzer Bench Identification
- NOXMAT
- Data Acquisition Systems

Process Analyzers

FIDAMAT 6 Service & Repair

Course code: **PIA-PACONAC4**

Target audience
This hardware course is intended for individuals responsible for the maintenance and operation of Siemens Fidamat 6 Continuous Gas Analyzer.

Course Profile
In this course students will setup, calibrate and perform basic maintenance functions on the Siemens Fidamat 6 Flame Ionization Continuous Gas Analyzer. This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate the Fidamat 6 analyzer using zero and span gasses.
- Replace the primary modules in Fidamat 6
- Light and adjust the FID
- Set parameters in the 6 series analyzers thru the HMI.
- Clean the detector cells

Topics
- Principle of FIDAMAT Operation
  - Electronic Board Identification
  - Analyzer Bench Identification
  - Flame Ionization
- FIDAMAT Maintenance
  - Calibration
  - Cell Cleaning
  - Bench Disassembly
  - Panel Operation
  - Software
- Labs
  - Calibration
  - Hardware Assembly
  - Hardware Disassembly
  - Software and Communications
  - Familiarization and Identification of Hardware and Parts

Process Analyzers

LDS-6 LASER 6 Operations and Maintenance

Course code: **PIA-PACGLDS6**

Target audience
This overview course is intended for individuals responsible for the maintenance and operation of Siemens LDS-6.

Course Profile
This course covers maintenance and calibration of the Siemens Laser LDS-6 Analyzer including hardware and software. This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate the LDS-6 analyzers
- Replace the primary modules in the controller, transmitter and receiver.
- Set parameters thru the HMI and in the LDS Com PC software.
- Perform an alignment between the transmitter and Detector.

Process Analyzers

Process Analyzers

Maxum Analyzer Networks

Course code: **PIA-PAMAXUM5**

Target audience
This course is intended for individuals responsible for maintaining the Maxum Process Gas Chromatograph (PGC). Engineers and technicians who will design and maintain the communication network connecting the Maxum PGC, maintenance workstations and the plant Distributive Control Systems (DCS).

Course Profile
This course gives the students hands-on experience with the Maxum Gas Chromatograph Network systems. Students will learn skills they can use to design, install, and maintain Maxum Ethernet networks, Advance Data Hiway systems, Gateway units, Modbus tables, and OPC servers.

Objectives
Upon completion of this course, the student shall be able to:
- Design a Maxum Ethernet network
- Configure a Maxum to communicate on a Maxum Ethernet network.
- Setup ADH to Ethernet Gateway.
- Configure a Maxum to communicate via Modbus or OPC with a DCS interface.
- Edit a Maxum Modbus Map.
- Install and configure a typical Maxum OPC server.

Topics
- Network Overview
- Advance Data Highway (ADH)
  - Design Advance Data Hiway Networks
  - Conduct 9V Battery Loop Test
  - Gateway ADH to Ethernet Configuration
  - Convert ADH Network to Maxum Ethernet
- Ethernet
  - Design Ethernet Networks for Maxum PGC systems with Switches and Fiber Optic Cables
  - Configure Subnets and Gateways
  - Configure Maxum Database for Ethernet
- Modbus
  - Develop Modbus Maps using Excel
  - Troubleshoot communications
  - Simulate DCS communications
- Maxum OPC Server
  - Configure Maxum Tables for OPC
  - Setup Maxum OPC Sever
  - Setup COM/DCOM to Client software

Process Analyzers

Maxum Gas Chromatograph Portal Workshop

Course code: **PIA-PAMAXGCPWS**

Target audience
This course is designed for users experienced with Maxum System Manager / EZChrom workstation software who want to learn how to use Siemens Gas Chromatograph Portal (GC Portal) workstation software to perform maintenance on the Maxum Gas Chromatograph.

Prerequisites
- Maxum Operation Level 1
- Maxum Operation Level 2

Course Profile
In this course users will get an overview of the Maxum GC Portal workstation software and complete the same exercises done in Maxum Operation Level 1 and Level 2 using GC Portal.

Topics
- Maxum GC Portal Overview
- Maxum GC Portal Network View
- Backup and Restore Database
- View Chromatograms
- Setup Method
- Analyzer Calibration
- Modify Validation Sequence
- Adding hardware
- Adding user specified alarms
- Add Auto Validation
- Editing a Method
- Formula Editor
- DB Converter
- Upgrading the analyzer

Process Analyzers

Maxum HRVOC Operations & Maintenance

Course code: **PIA-PAMAXHRV**

Target audience
This hardware course is intended for individuals responsible for maintaining the HRVOC Maxum Gas Chromatograph. This class is for users who need to perform routine maintenance and calibration of the Maxum Gas Chromatograph used in HRVOC Flare and Cooling Tower Applications.

Prerequisites
- Basic Chromatography skills
- Process Gas Chromatography Technology

Course Profile
The course covers operation, maintenance, and calibration of the Maxum Gas Chromatograph. It also covers the hardware and related programming as well as covering the operation of the Maxum Workstation, which includes Table Editor and EZChrom. Maxum II Gas Chromatographs with HRVOC Cooling Tower and Flare Gas applications and sample systems are used in this class for the labs and lectures.

Objectives
Upon completion of this course, the student shall be able to:
- Perform basic maintenance on the Maxum Hardware modules.
- Balance the carrier gas flows.
- Setup the analyzer valve and EPC times
- Configure an EZChrom Instrument
- Adjust peak times using EZChrom
- Calibrate the analyzer with EZChrom
- Backup and Restore the analyzer database

Topics
- Maxum HRVOC Hardware Overview
- HRVOC Regulations Overview
  - Siemens Cooling Tower HRVOC Solution
  - Siemens Flare HRVOC Solution
- Maxum Applet Maintenance
  - Setting Flows at Pressure
  - Plumbing Configurations
- Maxum Detectors Maintenance
- Maxum Chromatograph
- Alarms
- Advance EZChrom Software
- Sample Systems

Process Analyzers

Maxum HRVOC Operations & Maintenance Short

Course code: **PIA-PAMAXHR3**

Target audience
This hardware course is intended for individuals responsible for maintaining the HRVOC Maxum Gas Chromatograph. This class is for users who need to perform routine maintenance and calibration of the Maxum Gas Chromatograph used in HRVOC Flare and Cooling Tower Applications.

Prerequisites
- Maxum Operation Skills
- Maxum Operation Level 1 OR Maxum Operations with GC Portal Level 1

Course Profile
The course covers operation, maintenance, and calibration of the Maxum Gas Chromatograph HRVOC Application. Maxum II Gas Chromatographs with HRVOC Cooling Tower and Flare Gas applications and sample systems are used in this class for the labs and lectures.

Objectives
Upon completion of this course, the student shall be able to:
- Perform basic maintenance on the Maxum Hardware modules.
- Balance the carrier gas flows.
- Setup the analyzer valve and EPC times
- Configure an EZChrom Instrument
- Adjust peak times using EZChrom
- Calibrate the analyzer with EZChrom
- Backup and Restore the analyzer database

Topics
- HRVOC Regulations Overview
  - Siemens Flare HRVOC Solution
  - Siemens Cooling Tower HRVOC Solution
- Maxum Applet Maintenance
  - Plumbing Configurations
  - Setting Flows at Pressure
- Maxum Detectors Maintenance
  - Flare Sample System
  - Cooling Tower Sample System
- Sample Systems
- Labs
  - Set Flows per Plumbing Diagram
  - Set Valve Switching Cooling Tower Application

Process Analyzers

Maxum MaxBasic Software Development

Course code: **PIA-PAMAXUM3**

Target audience
This software course is intended for individuals responsible for programming of the Maxum Gas Chromatograph and for users who need to perform routine software changes.

Prerequisites
- Maxum Operation Level 1

Course Profile
This course gives the students hands-on with the Workstation MaxBasic language editor for the Maxum Gas Chromatograph. The course covers operation of the software modules that come with the Maxum Workstation as well as options that can be added to the system. A fully functional copy of the MaxBasic Language Editor CD is included with the course at no additional charge.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Modify a MaxBasic programs
- Compile and save the program to the Maxum database.
- Create SQL statements to read and write to the Maxum database.
- Use parameter table entries and IARGs for variables in programs
- Create simple MaxBasic programs

Topics
- MaxBasic Overview
  - Making a Program Basics
  - Coding Standards
  - Online Reference
- Maxum Basic
  - If Then commands
  - Structure, Variables
  - Arithmetic Operators
  - Arrays and Sub Procedures
- Maxum Database
  - Foreign and Primary Keys
- Standard Query Language (SQL)
- Writing and Using Programs

Process Analyzers

Total Sulfur Application - Vapor Samples

Course code: **PIA-PAMAXTSA1**

Target audience
This course is intended for individuals responsible for routine maintenance and calibration of the Maxum Gas Chromatograph Total Sulfur Application measuring vapor samples such as flare gas.

Prerequisites
- Maxum Operation with GCP 1 Course

Course Profile
The course covers operation, setup, validation and calibration of the Maxum Gas Chromatograph Total Sulfur Application. This course uses interactive presentations and discussions on the four key areas of this application - multiple range dilution system, FID combustion to convert Sulfurs to SO2, SO2 chromatograph application, the FPD detector and validation setup. Course includes hands on exercises in an off-line database using GCP workstation software. Contact us for site specific customization.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the basic operation and maintenance of the FID and FPD.
- Adjust pressures and timing for the sample dilution system.
- Setup FID combustion for Sulfur conversions
- Setup and Calibrate the SO2 analytical Method.
- Setup sequences and validation for multiple sample gasses.

Topics
- Introduction
- FPD Detector Theory, Flow Setup, flame check and auto ignite
- SO2 Analytical Method, Flow setup, Backflush setup, Adjust Retention Times and Calibration
- FID Combustion System, Conversion of Total Sulfur to SO2, FID Operation, flame out and auto ignite
- Sample Dilution Operation, Setup, Adjust EPC pressures in each method/range based on peak size, Range Change Program
- Validation of Multiple Sample Gasses
- Maintenance Planning, Validation and Calibration, Sample System Pressures, temperatures and flows.

Process Analyzers

Process Analyzers

Maxum Operations with GC Portal Level 1

Course code: **PIA-PAMAXGCP1**

Target audience
This course uses Siemens Gas Chromatograph Portal (GC Portal) workstation software. Users wanting training using EZChrom, the legacy workstation software, should enroll in the Maxum Operation Level 1 Course. This course is intended for individuals responsible for maintaining the Maxum Gas Chromatograph and for users who need to perform routine maintenance and calibration.

Prerequisites
- Basic Chromatography skills
- Process Gas Chromatography Technology

Course Profile
This course covers operations, setup, and calibration of the Maxum Gas Chromatograph, an overview of the Maxum GC Portal workstation software. (GC Portal replaces both System Manager and EZChrom).

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Perform basic maintenance on the Maxum Hardware modules
- Balance the carrier gas flows.
- Setup the analyzer valve and EPC timing
- Access Maxums using GC Portal
- Adjust peak times with the GC Portal workstation software.
- Calibrate the analyzer with GC Portal
- Backup and Restore the analyzer database

Topics
- Maxum System Overview
- Maxum GC Portal Overview
- Maxum Hardware Overview
- Maxum Valve Maintenance
- Maxum Detectors Maintenance
- Maxum Chromatograph
- Parallel Chromatography
- GC Portal Method Software
- Color Touch Screen CIM

4.5 Days | Register here | More information

Process Analyzers

Maxum Operations with GC Portal Level 2

Course code: **PIA-PAMAXGCP2**

Target audience
This course uses Siemens Gas Chromatograph Portal (GC Portal) workstation software. Users wanting training using EZChrom, the legacy workstation software, should enroll in the Maxum Operation Level 2 Course. This course is intended for individuals who have completed the Maxum Operation with GC Portal Level 1 or the Maxum Operation with EZChrom Level 1 course and are responsible for maintaining the Maxum Gas Chromatograph.

Prerequisites
- Maxum Operations with GC Portal Level 1 OR Maxum Operation Level 1

Course Profile
This course provides the students with more hands-on training with the Maxum GC Portal workstation software. (GC Portal replaces both System Manager and EZChrom). This course continues reviewing the software table structure and how it can be modified to add functionality to the Maxum Gas Chromatograph. Students learn how to create methods and sequences from scratch, as opposed to modifying an existing method or sequence.

Objectives
Upon completion of this course, the student shall be able to:
- Setup and calibrate using the Color Touch Screen Control Interface Module (CIM).
- Run multiple level calibrations in GC Portal.
- Add Methods and Sequences in GC Portal
- Perform Analyzer software upgrades
- Setup Chromatogram and Data Logging
- Add User Specific Alarms
- Add peaks, valves and programs by creating a Method in GC Portal.
- Create STATMON files

Topics
- Advance Maxum System Overview Maxum
- GC Portal Overview
- Maxum Chromatograph
- GC Portal Methods Software
- Advance Utilities
- GC Portal Analyzer
- Integrated Control Environment

4.5 Days | Register here | More information

Process Analyzers

Maxum Simulated Distillation

Course code: **PIA-PAMAXUM8**

Target audience
This software course is intended for individuals responsible for the maintenance and operation of the Maxum Gas Chromatograph with the Simulated Distillation or Motor Gasoline Application.

Prerequisites
- Maxum Operation Level 1

Course Profile
This course covers setup and calibration of the Maxum Gas Chromatograph with a Simulated Distillation Application. This course covers the specific hardware and software associated with this application.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate a Simulated Distillation Maxum
- Configure Simulated Distillation functions
- Evaluate Motor Gasoline Application specific alarms
- Setup Temperature Ramp parameters

Topics
- Simulated Distillation Overview
  - Calibration
  - ASTM 2887
  - Sample Calibration
  - K Factor Select
  - Null
- Motor Gasoline Application
  - Basic Principle
  - Functional Description
  - Theory of Operation
  - Baseline Correction Options
  - Factor Select
  - MOGAS Alarms
  - Boiling Point Table
  - Calibration Standards

2 Days | Register here | More information

Process Analyzers

MicroSAM Maintenance

Course code: **PIA-PAMSAMS1**

Target audience
This software course is intended for individuals responsible for maintaining the MicroSAM Gas Chromatograph. This class is for users who need to perform routine maintenance and calibration of the MicroSAM Gas Chromatograph.

Prerequisites
- Maxum Operation Level 1

Course Profile
The course covers operation, maintenance, and calibration of the MicroSAM Gas Chromatograph. It also covers the hardware and related programming as well as covering the operation of the Maxum Workstation, which includes Table Editor and EZChrom.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Perform basic maintenance on the MicroSAM Hardware modules.
- Balance the carrier gas flows.
- Setup the analyzer valve times and EPC pressures
- Configure an EZChrom Instrument
- Adjust peak times using EZChrom
- Calibrate the MicroSAM with EZChrom.
- Backup and restore the analyzer database to a PC

Topics
- Hardware Overview
- Chromatograph
- Workstation
- Advance EZChrom Software
- Table Editor
- Labs

3 Days | Register here | More information

Process Analyzers

NOXMAT 6 Service & Repair

Course code: **PIA-PACONAC5**

Target audience
This hardware course is intended for individuals responsible for the maintenance and operation of Siemens Continuous Analyzer.

Course Profile
This course covers maintenance and calibration of the Siemens Noxmat 6 Paramagnetic Continuous Gas Analyzer hardware and software.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate the Noxmat 6 analyzer using zero and span gasses.
- Replace the primary modules in Noxmat 6
- Set parameters in the Noxmat 6 analyzers thru the HMI.

Topics
- Principle of NOXMAT Operation
  - Electronic Board Identification
  - Analyzer Bench Identification
  - Infrared Analysis
- Noxmat Maintenance
  - Calibration
  - Cell Cleaning
  - Condensate Trap
  - Bench Disassembly
  - Panel Operation
  - Software
- Labs
  - Calibration
  - Hardware Assembly
  - Hardware Disassembly
  - Software and Communications
  - Familiarization and Identification of Hardware and Parts

1 Day | Register here | More information

Process Analyzers

OXYMAT 6 Service & Repair

Course code: **PIA-PACONAC3**

Target audience
This hardware course is intended for individuals responsible for the maintenance and operation of Siemens OXYMAT 6 Continuous Gas Analyzer.

Course Profile
In this course students will setup, calibrate and perform basic maintenance functions on the Siemens Oxymat 6 Paramagnetic Continuous Gas Analyzer.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate the Oxymat 6 analyzer using zero and span gasses.
- Replace the primary modules in Oxymat 6
- Set parameters in the 6 series analyzers thru the HMI.
- Clean the detector cells

Topics
- Principle of OXYMAT Operation
  - Electronic Board Identification
  - Analyzer Bench Identification
  - Paramagnetic Oxygen
- OXYMAT Maintenance
  - Calibration
  - Cell Cleaning
  - Bench Disassembly
  - Panel Operation
  - Software
- Labs
  - Calibration
  - Hardware Assembly
  - Hardware Disassembly
  - Software and Communications
  - Familiarization and Identification of Hardware and Parts

1 Day | Register here | More information

Process Analyzers

Process Analyzers

ULTRAMAT 6 Service & Repair

Course code: **PIA-PACONAC2**

Target audience
This hardware course is intended for individuals responsible for the maintenance and operation of Siemens Continuous Analyzer.

Course Profile
In this course students will setup, calibrate and perform basic maintenance functions on the Siemens Ultramat 6 Infrared Continuous Gas Analyzer System including hardware and software.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate the Ultramat 6 analyzer using zero and span gasses.
- Replace the primary modules in Ultramat 6
- Replace and align the detector bench
- Set parameters in the Ultramat 6 thru the HMI.
- Clean the detector cell

Topics
- Principles of ULTRAMAT Operation
  - Electronic Board Identification
  - Analyzer Bench Identification
  - Infrared Analysis
- ULTRAMAT Maintenance
  - Calibration
  - Cell Cleaning
  - Condensate Trap
  - Pneumatic Pump
  - Bench Disassembly
  - Panel Operation
  - Software
- Labs
  - Calibration
  - Hardware Assembly
  - Hardware Disassembly
  - Software and Communications
  - Familiarization and Identification of Hardware and Parts

3 Days | Register here | More information

Process Analyzers

ULTRAMAT 23 Service & Repair

Course code: **PIA-PACGAC23**

Target audience
This hardware course is intended for individuals responsible for the maintenance and operation of Siemens Ultramat 23 Continuous Gas Analyzer.

Course Profile
In this course students will setup, calibrate and perform basic maintenance functions on the Siemens Ultramat 23 Infrared Continuous Gas Analyzer System including hardware and software.

This course can be taught at the customer's site and customized to meet the customer's needs. With advance notice, customer specific applications can be taught.

Objectives
Upon completion of this course, the student shall be able to:
- Calibrate the Ultramat 23 analyzer using zero and span gasses.
- Replace the primary modules in Ultramat 23
- Replace and align the detector bench
- Set parameters in the Ultramat 23 thru the HMI.
- Clean the detector cell

Topics
- Principles of ULTRAMAT 23 Operation
  - Infrared Analysis
  - Analyzer Bench Identification
  - Electronic Board Identification
- ULTRAMAT 23 Maintenance
  - Software
  - Panel Operation
  - Bench Disassembly
  - Pneumatic Pump
  - Condensate Trap
  - Cell Cleaning
  - Calibration
- Labs
  - Familiarization and Identification of Hardware and Parts
  - Software and Communications
  - Hardware Disassembly
  - Hardware Assembly
  - Calibration

3 Days | Register here | More information

Virtual Instructor-led Training

Introduction to Process Gas Chromatography

Course code: **PIA-PAOILOPTIA1**

Target audience
This class is intended for individuals seeking to gain a conceptual understanding of process gas chromatography and associated hardware. The course will provide the student with the fundamental principles of chromatographic parts and their inter-relationships. The operation and maintenance of Siemens Process Gas Chromatographs are taught in later courses.

Course Profile
This course introduces the student to process gas chromatography theory and technology. This is a live, instructor led, on-line course delivered in 2 hour learning modules through an innovative web application. Students are encouraged to complete assigned lab exercises during and after each session to reinforce the learning modules throughout the week. A professional Siemens instructor will also be available to answer student questions outside of scheduled class times.

Objectives
Upon completion of this course, the student shall be able to:
- Identify the various hardware components used in a Process Gas Chromatograph and know their general functions.
- Conceptually setup a Sample System using the custom documentation.
- Conceptually adjust column-valve times based on chromatograms and oven plumbing diagrams.
- Conceptually adjust peak times and integration windows to measure the correct peaks.
- Conceptually troubleshoot general problems in a Process Gas Chromatograph.

Topics
- Chromatographic Principles
- Sample Systems
- Chromatograph Column Theory
- Valve Operation and Maintenance
- Detector Operation and Maintenance
- Temperature Control
- Component Integration
- Analytical Techniques

10 Hours | Register here | More information

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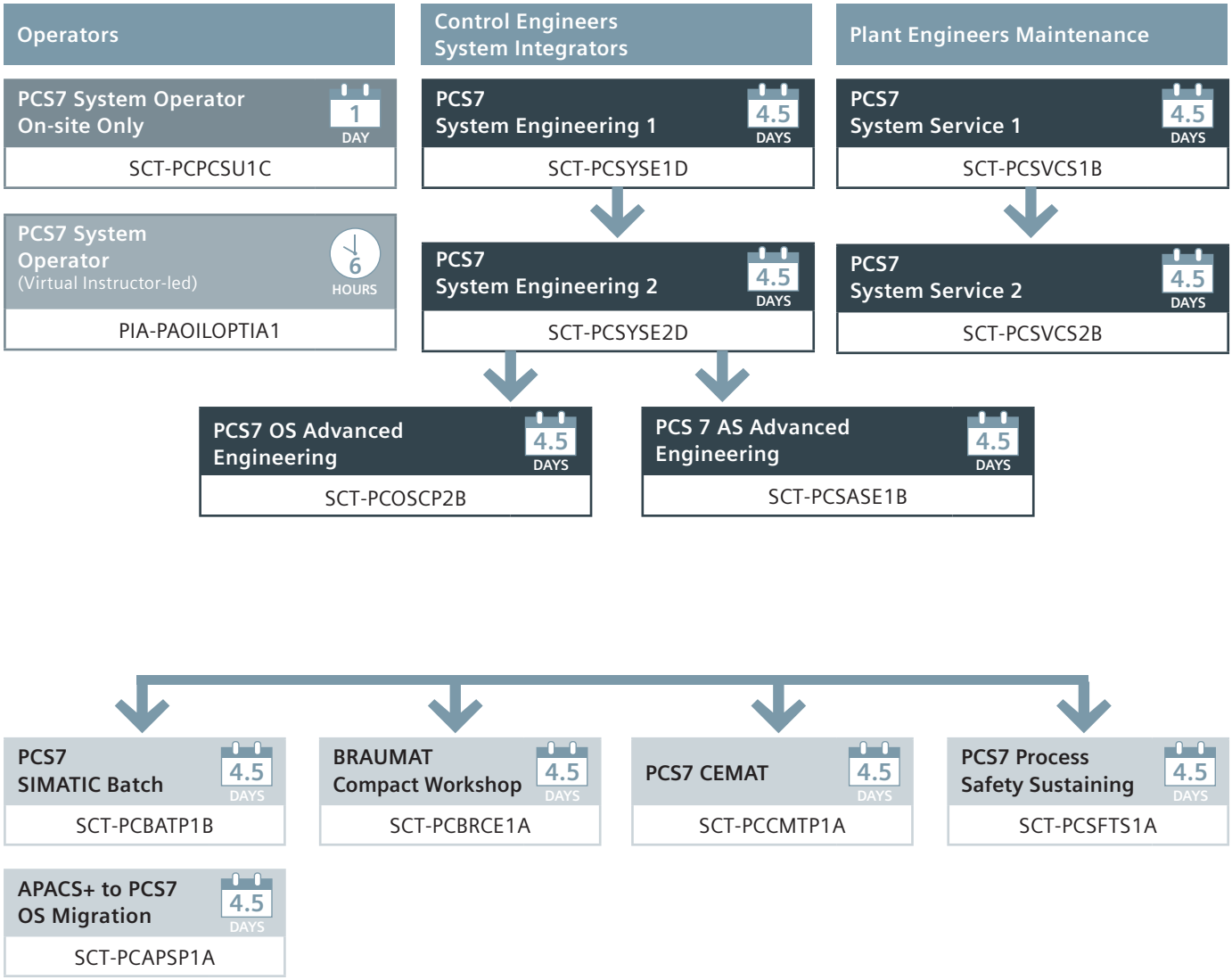
– APACS+ / PCS7 / TDC

Learning Map

Core courses | Custom courses | Virtual instructor-led courses | Optional learning



VIDEO

How-to Video Library
from the *Process Control - PCS7* category.

Optional and specialty courses:

Course name	Course code	Duration
200 APACS+ Maintenance & Configuration	SCT-AP200M1A	5 days

Process Automation – APACS+

200 APACS+ Maintenance & Configuration

Course code: **SCT-AP200M1A**

Target audience
Technicians, Site Engineers and Integration Engineers using APACS+ 4mation to develop a process system solution.

Prerequisites
- Computer Expertise

Course Profile
This course is designed for controls technicians and engineers who are responsible for project design, development and commissioning an APACS+ system. This course covers system architecture, as well as capabilities of system hardware components. These include control modules, I/O modules, system network components, servers and clients. Additionally, the student will be prepared to make changes and additions to an existing APACS+ controller configuration. Finally, the student will learn to navigate and interpret a controller configuration, modify an existing configuration and add new elements such as I/O tags and control loops.

Objectives
Upon completion of this course, the student shall be able to:
- Describe the architecture and hardware
- Move and connect field I/O points.
- Perform preventive maintenance.
- Troubleshoot a problem and identify the system component that has failed.
- Shutdown and restart a system as required
- Select appropriate hardware elements
- Diagnose the system using system diagnostics
- Navigate and interpret a controller configuration
- Modify existing controller configuration
- Read and force real-time data values
- Prepare a controller configuration for use

Topics
- ProcessSuite System Architecture Overview
- Module Mounting and Power Distribution
- Introduction to 4-mation™
- APACS+® ProcessSuite Troubleshooting
- Introduction to Controller Configuration
- Configure I/O Tags And Variables
- Ladder Logic Diagrams
- Managing The Resource Blocks

5 DAYS | Register here | More information

Process Automation – APACS+

APACS+ to PCS7 OS Migration

Course code: **SCT-PCAPSP1A**

Target audience
Technicians, Site Engineers and Integration Engineers familiar with APACS+/ProcessSuite should attend this course.

Prerequisites
- Working knowledge of the APACS system and HMI.

Course Profile
This course is designed to help existing users of APACS+/ProcessSuite systems transition into PCS 7/APACS+ OS as their HMI platform. This course builds upon previous APACS+/ ProcessSuite knowledge gained in the 101 APACS+ Maintenance course, 201 4-mation Configuration course and the 203 ProcessSuite Framework Configuration course. The student will learn to easily use PCS 7/APACS+ OS with a previously existing 4-mation configuration.

Objectives
Upon completion of this course, the student shall be able to:
- Compare APACS+ ProcessSuite, APS and PCS 7 / APACS+ Architecture
- Log on and off the runtime PCS 7 OS
- Operate a running APACS+ PCS 7 OS including Navigation, Process symbols, Faceplates, Alarm Messages
- Review the Types of HMI Comments
- Configure a DBA project for migration
- Start the migrated OS project into runtime
- Add External Variables manually
- Add an Internal Variable for Text Reference
- Edit graphic object properties
- Edit Customized Objects
- Insert and configure Trend objects
- Create and configure online Trends.
- Modify APACS+ alarms
- Customize PCS 7 OS Alarm Logging
- Identify the requirements for creating custom Tags, Faceplates and symbols using DBA

Topics
- Using PCS 7/APACS+ OS as an operator
- Creating an OS project from scratch
- HMI comments and Graphics Designer
- The OS Database and DBA type editor
- Alarms and Creating Custom Points

4.5 Days | Register here | More information

Process Automation – PCS7

BRAUMAT Compact Workshop

Course code: **SCT-PCBRCE1A**

Target audience
The target audience for this workshop includes PCS7 planning and brewery engineering personnel, software project engineers, system integrators, service and maintenance personnel.

Prerequisites
- PCS7 System Engineering 1
- PCS7 System Engineering 2

Course Profile
PLEASE NOTE: Prerequisite PCS7 System Engineering 1 is mandatory. Prerequisite PCS7 System Engineering 2 is recommended. The BRAUMAT Compact workshop is designed to provide participants with an opportunity to apply their PCS 7 engineering skills to hands-on tasks associated with creating, configuring and modifying a Braumat Compact project. This workshop is more hands-on practical exercises than theory (theory approx. 10 - 20%). The goals of this workshop are to aggressively guide the participant through a basic system project design, creation, and implementation using the BRAUMAT Compact library.

Objectives
Upon completion of this course, the student shall be able to:
- Configure BRAUMAT Compact within the PCS7 programming area.
- Create a recipe based on single sequences for multiple units.
- Configure a BRAUMAT Compact project utilizing the basic components of BRAUMAT Compact such as tag generator, Phasecon Matrix, batch trending, and batch reporting.

Topics
- Installation of BRAUMAT Compact
- Creation of a BRAUMAT Compact project
- Create a system with three interdependent subsystems
- Reporting and trending
- Scheduler
- Extending the recipe with logical functions
- Creation of function blocks using the BRAUMAT Compact concept

3.5 Days | Register here | More information

Process Automation – APACS+ / PCS7 / TDC

Process Automation – PCS7

PCS 7 AS Advanced Engineering

Course code: **SCT-PCSASE1A**

Target audience
This course is intended for PCS 7 users already proficient at engineering PCS 7 AS/OS projects.

Prerequisites
- PCS7 System Engineering 2

Course Profile
This is an advanced AS engineering course designed for experienced PCS 7 users, engineers and Solution Partners. The goals of this course are to enhance the student's skill-set by exploring advanced AS configuration topics and solutions to common application problems.

Objectives
Upon completion of this course, the student shall be able to:
- Calculate memory, systems structure and architecture requirements
- Configure automatic archives/read-back jobs and a distributed Engineering Station
- Compare project versions and use access protection
- Engineer with Advanced ES tools
- Use advance features of SFCs, SFC types and alarm messaging
- Use advanced Process Control (APC) strategies

Topics
- Common simulation tools
- PCS 7 Documentation and Online Support
- Requirements and functional process description
- System design and component specification
- PCS7 Project handling
- Advanced ES
- SFC Advanced
- Advanced alarm engineering
- Advanced Process Control (APC)

4.5 Days | Register here | More information

Process Automation – PCS7

PCS7 CEMAT

Course code: **SCT-PCCMTP1A**

Target audience
PCS 7 Planning engineers, Software project engineers, service and maintenance personnel, and system integrators should attend this course.

Prerequisites
- Basic knowledge of SIMATIC PCS7 V7.0

Course Profile
This course covers BRAUMAT compact within the PCS7 programming area. Students learn to create a recipe based on single sequences for multiple units. Additionally they gain knowledge of the basic components of BRAUMAT Compact like the Taggenerator, the Phasecon Matrix, Batch Trending and Batch reporting.

Objectives
Upon completion of this course, the student shall be able to:
- Move and connect field I/O points.
- Perform preventive maintenance
- Troubleshoot a problem and identify the system component that has failed.
- Shutdown and restart a system as required or after a power failure.
- Select appropriate hardware elements for system expansion
- Use the ProcessSuite Vision system diagnostics

4.5 Days | Register here | More information

Process Automation – PCS7

PCS7 OS Advanced Engineering

Course code: **SCT-PCOSCP2B**

Target audience
This course is intended for PCS 7 users already proficient at engineering PCS 7 AS/OS projects.

Prerequisites
- PCS7 Experience Credentials
- PCS7 System Engineering 1

Course Profile
This is an advanced OS engineering course designed for experienced PCS 7 users, engineers and Solution Partners. The goals of this course are to enhance the student's skill-set by exploring advanced OS configuration topics and solutions to common application problems. This course begins with an existing AS project and a brief but thorough introduction to it. Using this "base" project and advanced programming techniques, various OS architectures will be added. OS graphic development will include "best practice" methods as well as advanced topics such as C-script, VB script, Faceplate functionality and custom solutions.

Objectives
Upon completion of this course, the student shall be able to:
- Perform a typical process system configuration
- Configure a fully functioning PCS7 OS project
- Configure and use SIMATIC Logon
- Configure Autostart for all OS stations
- Create and configure custom graphics as well as custom faceplates
- Create and configure various PCS 7 architectures including Server/Client, Redundant Server, Web Server/Client and Multi-project set up.
- Setup and use OS Simulation

Topics
- Introduction to training
- PCS 7 Documentation and Online Support
- Basics of OS configuration
- The Client/Server Configuration
- The Server Redundancy
- Extended Configuration of Multi-user Projects
- The Web Option
- Long-term Archiving
- Graphic Configuration
- The Graphic Object Update Wizard
- Syntax Rules

4.5 Days | Register here | More information

Process Automation – PCS7

PCS7 Process Safety Sustaining

Course code: **SCT-PCSFTS1A**

Target audience
This course is for site engineers and maintenance staff responsible for the sustaining and operation of a Siemens PCS7 based Safety Instrumented System (SIS).

Course Profile
This course builds skills for sustaining and operating a Siemens PCS7 Process Safety system. The course begins with an introduction to Process safety system concepts, purpose and typical process control architectures. The course then builds skills in hardware components, basic SIMATIC project management and system troubleshooting.
A light review of system program elements and tools is included to support systems level troubleshooting. The Safety Matrix, a tool available for safety cause and effect configuration is also covered. The class will use a functioning safety demo project with minimal system programming.

Objectives
Upon completion of this course, the student shall be able to:
- Use the basic knowledge of a process safety control system to properly sustain an existing system.
- Configure the proper hardware of the CPU and signal modules to ensure appropriate system response.
- Navigate a safety project
- Configure the Safety Library blocks to manage a safety shutdown program.
- Configure using the Safety Matrix programming tool
- Operate, control and troubleshoot a safety system using the Safety Matrix tool.
- Troubleshoot the system using various software tools and status indicators.

Topics
- Process Safety Overview
- Siemens Process Safety
- Project Management
- Configuring Hardware (HW)
- Continuous Functions Charts (CFC)
- Safety Matrix
- System Troubleshooting

Process Automation – PCS7

PCS7 SIMATIC Batch

Course code: **SCT-PCBATP1B**

Target audience
This course is for PCS7 system design engineers, configuration engineers, programmers, commissioning personnel, and OEMs working with the SIMATIC Batch option.

Prerequisites
- PCS7 System Engineering 1
- PCS7 System Engineering 2 (Recommended)

Course Profile
This course is an introduction to Siemens SIMATIC Batch processing. Using the same project created during the prerequisite PCS 7 System Engineering training courses, students will review a typical batch process model to understand process elements and terminology. Students will then use the same sample batch process to learn batch tools, management and control skills. Security, system administration and batch control techniques topics are included. Recipe generation and planning considerations are also discussed.

Objectives
Upon completion of this course, the student shall be able to:
- Define the terms and procedural model according to the ISA S88.01
- Set up the hardware configuration; define SIMATIC Batch structure, a P-Cell, Unit, Functions in Plant View and CFC
- Properly compile and download a Batch project.
- Navigate file structures on BATCH Server.
- Utilize BATCH faceplates and other OS Batch controls in the OS.
- Execute all configuration steps on the ES to start up a BATCH server successfully
- Create a new Pcell, handle materials, write/edit/release master recipes.
- Create new users and set up user rights.
- Set up batches based on the quantity of the order and batch dependencies.
- Access data of finished and archived batches.
- Perform Online Structure Changes.

Topics
- PCS 7 Documentation and Support
- Functional Process Description
- Batch Systems Basics
- SIMATIC Batch in SIMATIC Manager and OS
- SIMATIC Batch offline and offline

Process Automation – PCS7

PCS7 System Engineering 1

Course code: **SCT-PCSYSE1D**

Target audience
Controls engineers using PCS7 to develop a process system solution.

Prerequisites
- Basic automated controls experience
- Industrial electronics experience
- Solid computer skills

Course Profile
This course is designed for controls engineers who are responsible for project design, development and commissioning a PCS7 system. The goals of this course are to aggressively help the student learn a basic system configuration and project design using standard system tools and libraries.

Objectives
Upon completion of this course, the student shall be able to:
- Define the requirements and components of a PCS7 system solution.
- Configure a multiproject complete with Component and Plant Hierarchy
- Configure basic Continuous Function Charts using standard system tools and libraries.
- Configure basic Sequential Function Charts using standard system tools and libraries.
- Configure a basic Operator Station configuration using standard system tools and tag interfacing.
- Configure and test basic network communications including, Ethernet and PROFIBUS DP.
- Perform a basic system check out using standard system tools and diagnostics.
- Use the Help, Documentation and On-line tools.
- Perform basic system administration and project management functions.

Topics
- PCS 7 Documentation and Online Support
- Requirements and Functional Process Description
- System Design and Component Specification
- Project setup
- Station and network configuration
- Connection to the process
- Basics control functions
- Basics Operating and Monitoring
- Basics Automatic Mode Control

Process Automation – APACS+ / PCS7 / TDC

Process Automation – PCS7

PCS7 System Engineering 2

Course code: **SCT-PCSYSE2D**

Target audience
Controls engineers using PCS7 to develop a process system solution and need an advanced level system configuration and integration skills.

Prerequisites
- PCS7 System Engineering 1

Course Profile
This is an advanced process control course for engineers. The goals of this course are to aggressively help the student learn advanced level system configuration and project engineering. This course begins with the project configured in the System Engineering-1 course and elevates the functionality through advanced Engineering Station programming, Operator Station graphics development and, Automation Station hardware integration.

Objectives
Upon completion of this course, the student shall be able to:
- Perform typical process system configuration.
- Configure functioning PCS7 project.
- Perform fast bulk engineering.
- Configure custom blocks using SCL.
- Configure custom graphics.
- Set up Operator Station user administration.
- Replicate Plant Hierarchy using the models tool.
- Create and configure alarm and tag archives.
- Configure Ethernet communications.

Topics
- Customizing the OS
- Archiving System
- Locking functions and operating modes
- Mass data engineering
- Final steps of configuration
- User blocks: Attributes and Visualization
- Demonstration Server-Client System
- Syntax Rules

4.5 Days | Register here | More information

Process Automation – PCS7

PCS7 System Operator

Course code: **SCT-PCPCSU1C**

Target audience
This course targets PCS7 system operators, production supervisors, and administrative staff who require a working knowledge of the system. Additionally, anyone in need of building a basic, operational understanding of the PCS7 process control system. The Day 2 option is targeted for operators with basic technical diagnostic responsibilities and backgrounds.

Course Profile
This course provides the student with a working exposure to the PCS7 OS control system. This is a flexible agenda with a 1 day core agenda plus a "Day 2 option" with advanced system diagnostics. Using a prebuilt Siemens demo project, the students will learn PCS7 system operational functions and procedures in a safe and controlled environment. The Day 2 option is targeted for those operators with additional system diagnostics responsibilities. This course is a hands-on curriculum working with a typical simulated production process.

Objectives
Upon completion of this course, the student shall be able to:
- Understand the PCS7 control system architecture
- Navigate the system screen hierarchy
- Control and monitor a production process
- Use the system keysets and functions
- Use the Trending and Messaging systems
- Use the Reports and Archive systems
- Use the system Hardware Configuration and Diagnostics tools (Day 3 option)

Topics
- PCS7 Overview
- Demo Project Screen Review
- PCS7 OS Process Mode
- System Operator Inputs
- Graphic System Control
- Trend, Message and Reports Systems
- Archive System
- Maintenance Station (Day 2)
- PCS7 System Hardware Overview (Day 2)
- System Troubleshooting Basics (Day 2)

4.5 Days | Register here | More information

Process Automation – PCS7

PCS7 System Service 1

Course code: **SCT-PCSVCS1B**

Target audience
Plant Engineers, Technicians and Users responsible for operating, optimizing and troubleshooting a PCS7 system should attend this course.

Prerequisites
- Computer Expertise
- Industrial electronics experience

Course Profile
This course is designed for individuals receiving an engineered PCS7 system and are responsible for system sustaining and service. The goals of this course are to help the student learn to efficiently use, optimize and troubleshoot their process through the PCS7 system.

Objectives
Upon completion of this course, the student shall be able to:
- Navigate PCS7 documentation.
- Navigate a PCS 7 OS runtime station.
- Use the system architecture to aid in diagnostics.
- Identify which part of the database is responsible for each part of the configuration.
- Navigate PCS 7 Multiproject structure.
- Identify different causes of errors/faults.
- Analyze problems efficiently.
- View messaging system.
- View the Asset Diagnostics system.
- Perform diagnostic maintenance of CFC and SFC charts using various PCS 7 tools.
- Analyze AS, OS, PC and communication diagnostics.
- Configure and use the SDT (SIMATIC Diagnose Tool).
- Replace faulty modules/devices..

Topics
- Introduction to training
- SIMATIC PCS 7 Documentation and Online Support
- Requirements and Functional Process Description
- System Design and Component Specification
- Project-specific settings
- Project-specific architecture and Configuration
- Methods for problem analysis
- Diagnostics options with PCS 7
- Procedure for eliminating problems

4.5 Days | Register here | More information

Process Automation – PCS7

PCS7 System Service 2

Course code: **SCT-PCSVCS2B**

Target audience
Plant Engineers, Technicians and Users responsible for operating, optimizing and troubleshooting a PCS7 system should attend this course.

Prerequisites
- PCS7 System Service 1

Course Profile
This course is designed for individuals receiving an engineered PCS7 system and are responsible for system sustaining, service and basic modification. The goals of this course are to help the student learn to efficiently use, optimize and troubleshoot their process as well as replacements and additions to it.

Objectives
Upon completion of this course, the student shall be able to:
- Navigate PCS7 OS runtime station
- Use the system architecture
- Navigate PCS 7 Multiproject
- Identify different causes of errors/faults
- View messaging system
- Enable/repair OS Simulation, Asset Diagnostics
- Enable/repair SIMATIC Logon
- Enable/repair OPC Server functionality
- Force block values in run-time
- Use ApDiag.exe
- Use SIMATIC Diagnostics Tool (SDT)
- Implement alarm management techniques
- Use the built-in PID tuner
- Modify basic configurations of charts
- Add/modify basic DP, PA & HART field devices
- Expand networks
- Create/restore Siemens computer images
- Follow link to view full description on the website

Topics
- Introduction to training
- SIMATIC PCS 7 Documentation and Online Support
- Requirements and Functional Process Description
- Method for problem analysis
- Diagnostic possibilities with PCS 7
- Plant Optimization
- Plant expansion
- Adding an OS station

4.5 Days | Register here | More information

Process Automation – TDC

SIMATIC TDC Engineering with D7 and CFC

Course code: **SCT-PCTDCP2A**

Target audience
Programmers, Commissioning engineers, configuring engineers and service personnel should attend this course.

Prerequisites
- S7 Automation Maintenance 1 OR S7 TIA Programming 1

Course Profile
This course is designed for service technicians and commissioning/configuration engineers who are responsible for project maintenance, design, development and commissioning a TDC system using CFCs. This course provides you with the knowledge for programming and commissioning the control system SIMATIC TDC. After the training you will be able to configure technological functions with CFC and establish the communication via PROFIBUS, Industrial Ethernet and GDM-connection.

Objectives
Upon completion of this course, the student shall be able to:
- Obtain help using the online documentation
- Configure rack hardware
- Copy, archive and restore a project
- Configure the PG/PC interface
- Create and edit a program using CFC blocks
- Configure the processing sequence of CFC blocks
- Configure scan times and interrupts
- Create run-time groups
- Save, compile, and load the program to the memory module
- Monitor program and hardware operation using Test Mode
- Create and use reference data for a program
- Convert a task to a program (Chart in chart, chart as block)

Topics
- Working with the SIMATIC-Manager
- Hardware configuration for the system
- Preparation of CFC charts for this system
- Working with own blocks and chart in chart
- Communication-Hardware and its ranges
- Introduction to the communication
- Processor communication

4.5 Days | Register here | More information

Virtual Instructor-led Training

PCS7 System Operator

Course code: **SCT-PCOILPCSU1C**

Target audience
This course targets PCS7 system operators, production supervisors, and administrative staff who require a working knowledge of the system. Additionally, anyone in need of building a basic, operational understanding of the PCS7 process control system.

Course Profile
This course provides the student with a working exposure to the PCS7 OS control system. Using a prebuilt Siemens demo project, the students will learn PCS7 system operational functions and procedures in a safe and controlled SIMULATED plant environment. All core operational tasks and system tools are discussed and practiced by the students. Typical operator system inputs, acknowledgments, control and monitoring tasks are included. This course is a hands-on curriculum working with a typical simulated production process.

This is a live, instructor led, on-line course delivered in two hour learning modules through an innovative web application. Access to fully functional PCS7 software will be provided to the student through a cloud based application.

Objectives
Upon completion of this course, the student shall be able to:
- Identify the PCS7 control system architecture
- Navigate the OS system screen hierarchy
- Control and monitor a production process
- Navigate the system keysets and functions
- Access the Trending and Messaging systems
- Create / access the Reports and Archive systems

Topics
- PCS7 Overview
- Demo Project Screen Review
- PCS7 OS Process Mode
- System Operator Inputs
- Graphic System Control
- Trend System
- Message System
- Functions and Outputs of the Report System
- Archive System

3 Days | Register here | More information

Process Instrumentation

Learning Map

Core courses | Virtual instructor-led courses | Optional learning

The Siemens process instrumentation training curriculum offer students a variety of options for learning specific technologies and also applications within different industries. Technology courses provide an in depth theory of operation, product selection criteria and provides hands-on labs for maintenance, troubleshooting and repair. Our industry courses provide an overview of how devices are applied into each specific industry and covers process overviews, technology comparisons, application pitfalls, and basic hands-on labs for start-up and commissioning.

Technology Courses

Field Instrumentation — 3 DAYS
PIA-PRT5C1A

Flow Technologies — 3 DAYS
PIA-PRT3C1A

Level Technology — 4 DAYS
PIA-PRT1C1A

SITRANS FUS/FUE Clamp-On Products — 3 DAYS
PIA-PRFUEC1A

SITRANS FUH Clamp-On Products — 3 DAYS
PIA-PRFUHC1A

SITRANS FUG Clamp-On Products — 3 DAYS
PIA-PRFUGC1A

Industry Courses

Water Industry — 3 DAYS
PIA-PRWATC1A

Oil & Gas Upstream — 3 DAYS
PIA-PROGUC1A

Midstream Gas — 3 DAYS
PIA-PROGGC1A

Midstream Liquid — 3 DAYS
PIA-PROGLC1A

Process Instrumentation

Field Instrumentation

Course code: **PIA-PRT5C1A**

Target audience
Service personnel and customers using process instruments.

Course Profile
Combining hands-on tutorials with theory sessions, this course teaches participants the principles of field instrumentation, including pressure and temperature measurement, and electro-pneumatic and ultrasonic technologies. Working with the PI product portfolio, students gain an understanding of common applications, troubleshooting, customer requirements, and how to select a suitable product.

Topics
- Pressure
  - Introduction to pressure principles and technology
  - Pressure terminology
  - Programming
  - Common applications
  - Maintenance and troubleshooting
- Temperature
  - Theory
  - Transmitter design
  - Programming temperature diagnostics
- Valve Positioners
  - Introduction to Valve positioners
  - Valve positioner technology
  - Programming and initialization
  - Applications

3 Days | Register here | More information

Process Instrumentation

Flow Technologies

Course code: **PIA-PRT3C1A**

Target audience
This course is for service personnel and customers unfamiliar with flow meter technologies and the proper use of these process instruments.

Course Profile
Using hands-on tutorials and theory sessions, this course gives participants a comprehensive overview of several flow measurement technologies using the PI Coriolis mass flow, electromagnetic volume flow, Vortex flow measurement, and ultrasonic flow measurement technologies. Covering commonly used flow product lines and common applications, participants learn the principles of flow measurement, product features, product selection, understanding and meeting customer requirements, and basic troubleshooting of applications and installations.

Objectives
Particpants will:
- Learn the principles of flow measurement.
- Review commonly used flow technologies and common applications.
- Explore product features and selection of flow technology based on application requirements.
- Learn basic troubleshooting of applications and installations.

Topics
- Introduction to flow measurement and why it is a critical process variable
- Theory, history, and terminology
- Flow markets and key applications
- Working principles, installation, commissioning, common errors, and unique selling points of:
  - Coriolis MASSFLO flow meters
  - Electromagnetic flow meters
  - Ultrasonic flow meters - Transit time and Doppler
  - Vortex flow meter
- Product selection by application
- Installation guidelines
- Hands-on exercises on each type of technology presented

4 Days | Register here | More information

Process Instrumentation

Level Technology

Course code: **PIA-PRT1C1A**

Target audience
This course is intended for individuals responsible for basic set-up and calibration of the solids and liquid level measurement devices for Siemens PI.

Course Profile
Combining hands-on tutorials with theory sessions, this course teaches participants the principles of solids and liquid level measurement using the Siemens Process Instrumentation ultrasonic, radar, capacitance, guided wave radar and point level detection technologies. Covering product lines and common applications, participants learn the basics of point and continuous level measurement, product features, product selection, and troubleshooting.

Objectives
Participants will:
- Gain an understanding of the measuring principles for contacting and non-contacting level instrumentation.
- Obtain and understand the principle of operation, selection of sizing, and basic programming for ultrasonic, radar, guided wave radar, pressure, and capacitance.
- Acquire an understanding of when and how to apply each technology to a specific application in order to give the application the best chance of being successful.
- Acquire knowledge of industrial communication instruments and software to remotely monitor applications.

Topics
- Ultrasonics:
  - Theory of operation
  - Applications, programming and installation basics
  - Support Software
- Non-Contacting Microwave Radar:
  - Theory of operation
  - Pulse, FMCW, 2-wire
  - Power, Frequency, Cost
  - SIMATIC PDM
  - Applications and installation basics
- Guided Wave Radar:
  - Theory of operation
  - Applications and installation details
- Capacitance
  - Theory of operation and Applications

4 Days | Register here | More information

Process Instrumentation

SITRANS FUG1010 Clamp-On Products

Course code: **PIA-PRFUGC1A**

Target audience
This is an advanced course intended for technical individuals responsible for maintenance and operation of SITRANS FUG010 Natural Gas clamp-on flowmeters.

Prerequisites
- Training Course PIA-PRFUEC1A
- Knowledge of Natural Gas Industry Terminology

Course Profile
Combining hands-on tutorials with theory sessions, this course teaches participants the configuration and application details of the SITRANS FUG1010 product line as it relates to the gas industry. This course is an advanced course with focus on the FUG product. Additionally, the course covers many of the applications for the products as well as installation and troubleshooting.

Objectives
Particpants will learn:
- Principles of transit-time clamp-on flow meters for the gas industry.
- Programming fundamentals, requirements, and options.
- Installation requirements and procedures.
- Commissioning and verification.
- Troubleshooting and corrective action.
- Utilization of supporting diagnostic software and tools.
- Communication options.

Topics
- Model selection and part numbering
- Fundamental theory and application considerations
- Programming techniques
- Installation methods and guidelines
- Hands-on installation exercises
- Construction and loading of AGA8 tables
- Basic troubleshooting
- Use of Si-Ware® serial data software

3 Days | Register here | More information

Process Instrumentation

SITRANS FUH1010

Course code: **PIA-PRFUHC1A**

Target audience
This is an advanced course intended for technical individuals responsible for maintenance and operation of SITRANS FUH Hydrocarbon clamp-on flowmeters and associated leak detection systems.

Prerequisites
- Training Course PIA-PRFUEC1A
- Knowledge of Hydrocarbon Industry terminology

Course Profile
Combining hands-on tutorials with theory sessions, this course teaches participants the configuration and application details of the SITRANS FUH1010 and Leak Detection product line as it relates to the Hydrocarbon Liquid industry. This course is an advanced course with focus on the FUH product and leak detection designs. Additionally, the course covers many of the applications for the products as well as installation and troubleshooting.

Objectives
Participants will learn:
- Principles of transit-time clamp-on flow meters for the Hydrocarbon industry.
- Programming fundamentals, requirements, and optimization.
- Installation requirements and procedures.
- Commissioning and verification.
- Troubleshooting and corrective action.
- Utilization of supporting diagnostic software and tools.
- Communication options.

Topics
- Theory and application considerations
- Installation methods, requirements and guidelines
- Detailed analysis of diagnostic data
- Enhanced application troubleshooting
- Construction and Programming liquid tables
- Assessment and correction of operational issues and communications
- Use of Si-Ware® serial data software

3 Days | Register here | More information

Process Instrumentation

SITRANS FUS/FUE1010 Clamp-On Products

Course code: **PIA-PRFUEC1A**

Target audience
This course is intended for technical individuals responsible for routine maintenance and calibration of SITRANS FUS/FUE/FST clamp-on flowmeters. Additionally sales representatives responsible for selling and specifying these meters will benefit from this class.

Prerequisites
- Basic knowledge of pipes and piping system terminology

Course Profile
Combining hands-on tutorials with theory sessions, this course teaches participants the configuration details of the products in the FUS/FUE product line. Additionally, the course covers many of the applications for the products as well as installation and troubleshooting.

Objectives
Participants will learn:
- Principles of transit-time and Doppler clamp-on flow meters for liquids.
- Programming fundamentals, requirements, and options.
- Installation requirements and procedures.
- Commissioning and verification.
- Troubleshooting and corrective action.
- Utilization of supporting diagnostic software and tools.
- Communication options.

Topics
- Model selection and part numbering
- Fundamental theory and application considerations
- Programming techniques
- Installation methods and guidelines
- Hands-on installation exercises
- Basic troubleshooting
- Use of Si-Ware® serial data software

3 Days | Register here | More information

Process Instrumentation

Water Industry

Course code: **PIA-PRWATC1A**

Target audience
This course is intended for individuals responsible for start-up and general maintenance of process instrumentation within the water and wastewater industry.

Course Profile
This course is designed to provide students with technical knowledge required to specify, apply, install, and maintain process instruments utilized in both drinking water and waste water applications. This course will cover basic theory of operation, applications, installation and commissioning considerations of flow, level, pressure and temperature technologies.

Objectives
Participants will gain an understanding of the various technologies and theories of operation for level, flow, pressure, and temperature products used in the Water and Waste Water Industry

Topics
- Overview of conventional WWTP & WTP processes
- Ultrasonic level measurement
- Electromagnetic Flow meters
- Clamp-On Ultrasonic Flowmeters
- Digital differential pressure transmitters
- Temperature Transmitters and Sensors

Process Instrumentation

Oil & Gas Upstream

Course code: **PIA-PROGUC1A**

Target audience
This course is intended for individuals responsible for start-up and general maintenance of process instrumentation within the upstream oil & gas industry.

Course Profile
Using hand-on labs and applications in the oil and gas upstream process, this course gives participants an overview of several process technologies in flow, temperature, pressure, level and positioners. Working with the P1 product portfolio, students gain an understanding of theory, installation and setup of flow, pressure, level, and positioner technologies.

Objectives
Students will learn how to install and setup instruments in flow, temperature, pressure, level, and positioners. They will also gain knowledge on specifications of the instruments and theory of the technologies.

Topics
- Overview of the Oil and Gas Upstream Process
- Injection Well Head
- Christmas Tree
- Separators
- Heater Treater
- Manifolds
- Vapor Recovery Unit
- Tank Batteries
- Chemical Injection at Production Well Sites

Process Instrumentation

Midstream Gas

Course code: **PIA-PROGGC1A**

Target audience
This course is intended for individuals responsible for start-up and general maintenance of process instrumentation within the midstream gas industry.

Course Profile
This course will provide students with knowledge to enable specification, application, and installation of Siemens process instruments utilized in midstream Natural Gas applications. With a combination of Theory, detailed description, and hands on labs the students win gain a working understanding of flow, pressure temperature, level and valve positioner technologies and how they apply to their applications. The course will review the processes and challenges faced in midstream applications and the solutions Siemens process instrumentation provide to meet these challenges.

Objectives
Upon completion of this course, the student shall be able to:
- Perform basic installation and commissioning of a range of Siemens process instruments
- Understand the capabilities of each product variant and where to apply which model for optimum performance
- Identify applications that may benefit from utilization of Siemens process instrumentation

Topics
- Midstream Gas process overview
- Detailed Review of Midstream Stages
- Product-Specific Tutorials & Hands-On Labs

Process Instrumentation

Process Instrumentation

Midstream Liquid

Course code: **PIA-PROGLC1A**

Target audience
This course is intended for individuals responsible for start-up and general maintenance of process instrumentation within the midstream liquids Industry.

Course Profile
This course will provide students with knowledge to enable specification, application, and installation of Siemens process instruments utilized in midstream Liquid applications. With a combination of Theory, detailed descriptions, and hands on labs the students will gain a working understanding of flow, pressure temperature, level and valve positioner technologies and how they apply their applications. The course will review the processes and challenges faced in midstream applications and the solutions Siemens process instrumentation provide to meet these challenges.

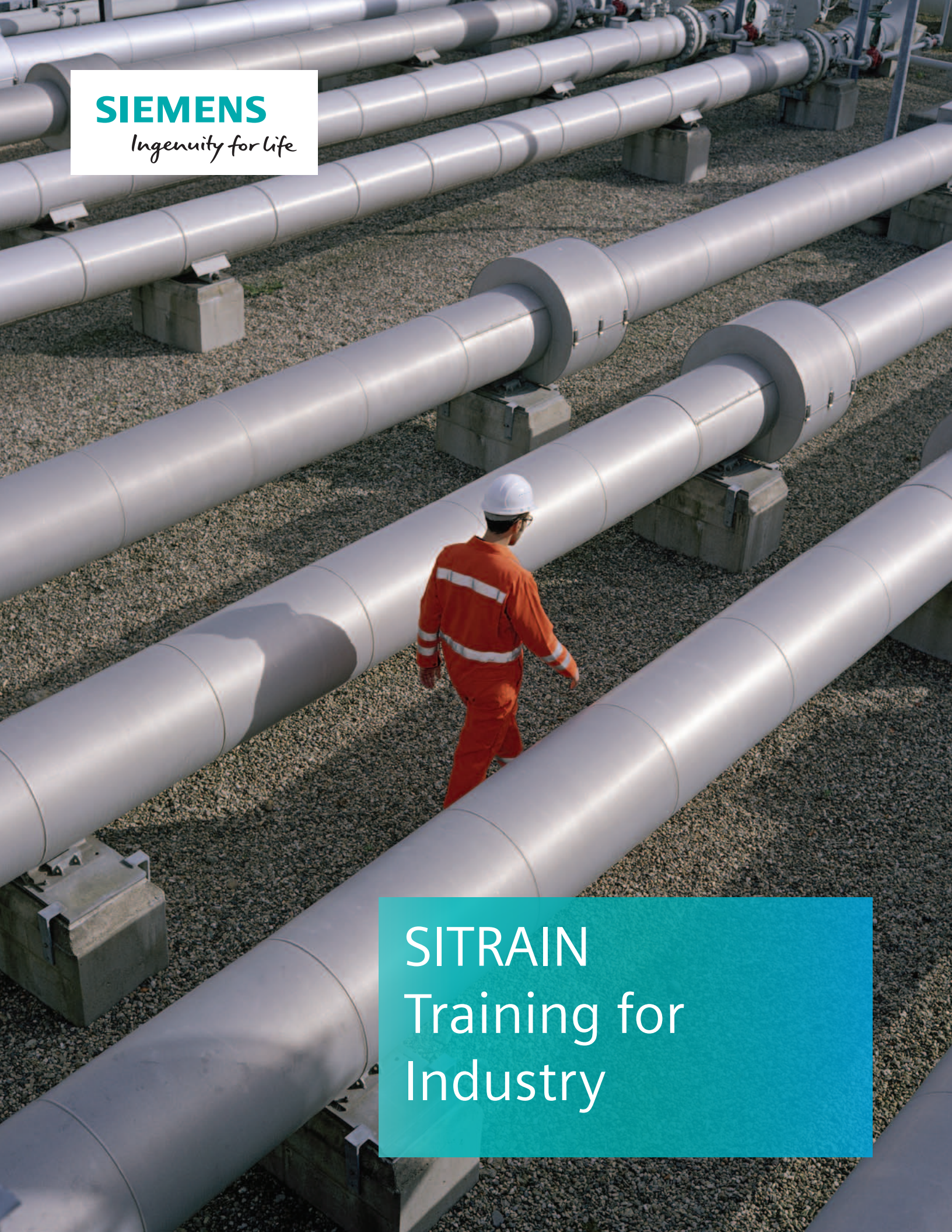
Objectives
Upon completion of this course, the student shall be able to:
- Perform basic installation and commissioning of a range of Siemens process instruments
- Understand the capabilities of each product variant and where to apply which model for optimum performance
- Identify applications that may benefit from utilization of Siemens process instrumentation

Topics
- Midstream Oil process overview
- Detailed Review of Midstream Stages
- Product-Specific Tutorials & Hands-On Labs

3 Days | Register here | More information

SIEMENS

Ingenuity for life



SITRAIN Training for Industry

Industrial Networking

Learning Map

Core courses

Certification for Engineers

Security in Industrial Networks — 3 DAYS
IEN-SECINS1A

Switching and Routing in Industrial Networks — 5 DAYS
IEN-IKSWROU1A

Wireless LAN in Industrial Networks — 3 DAYS
IEN-IKWLAN1A

Certification for Engineers

Security in Industrial Networks

Course code: **IEN-SECINS1A**

Target audience
Users involved with developing or sustaining automation networks in an industrial environment.

Course Profile
This course is one of three certification courses offered under the Siemens Certified Engineer for Industrial Networks (CEIN) program. The curriculum includes an introduction of the potential threats and risks associated with industrial networks, as well as a deep dive into defense in depth strategies. Students will be shown numerous ways to implement access control measures to protect and mitigate security incidents.

Topics
- Comprehensively protecting productivity
- Maintenance
- Risks
- Basics of security
- Cell protection
- Access protection
- Standard machines
- Remote maintenance

3 Days | Register here | More information

Certification for Engineers

Switching and Routing in Industrial Networks

Course code: **IEN-IKSWROU1A**

Target audience
Users involved with developing or sustaining automation networks in an industrial environment.

Course Profile
This course is one of three certification courses offered under the Siemens Certified Engineer for Industrial Networks (CEIN) program. The curriculum covers Network solutions and how they connect to real-time systems in theory and in practice. It also addresses the requirements and fundamental principles of industrial routing solutions.

Topics
- Switching
  - Ethernet Basics
  - On-site networking in automation
  - Increased availability in automation
  - Coupling automation segments
  - Networking with IT standards
  - Coupling automation and IT system
  - Seamless redundancy in the ring
  - Seamless redundancy
  - Separating different communication types
  - Useful Features
- Routing
  - Internet Protocol in Automation
  - Connecting to the IT Network
  - Redundant Connection to the IT Network
  - Extending an Existing Network
  - Dynamic Routing Protocols
  - Best Practices - Routing

3 Days | Register here | More information

Certification for Engineers

Wireless LAN in Industrial Networks

Course code: **IEN-IKWLAN1A**

Target audience
Users involved with developing or sustaining automation networks in an industrial environment.

Course Profile
This course is one of three certification courses offered under the Siemens Certified Engineer for Industrial Networks (CEIN) program. The curriculum covers the basic physics of WLAN, and the various wireless standards and access methods. Throughout the course, students will learn how to plan, configure and operate wireless solutions in industrial applications, in interaction with real-time systems

Topics
- Introduction to Industrial Wireless (IWLAN)
- Wireless Theory
- Antenna technology
- WLAN access procedures
- WLAN Standards
- Radio field planning
- Typical industry protocols
- iPCF
- iPCF-MC

3 Days | Register here | More information

Process Safety Management

Learning Map

Core courses

Process Safety Engineering

Disposal System Best Practices — 1 DAY
OGM-DISYSG1A

Pressure Relief Analysis Best Practices — 2 DAYS
OGM-PRAG1A

Process Safety Pressure Protection Manager — 2 DAYS
OGM-PSPPMG1A

Process Safety – Maintenance and Inspection

Process Safety Asset Integrity Manager — 3 DAYS
OGM-PSAIMG1A

UltraPIPE — 3 DAYS
OGM-ULPIPEG1A

Process Safety Engineering

Disposal System Best Practices

Course code: **OGM-DISYSG1A**

Target audience
Personnel who have the responsibility of maintaining and auditing the pressure relief system design basis documentation for OSHA 1910.119 compliance. The intended audience includes auditors, process engineers, technical managers, and project managers.

Course Profile
In recent years, refining and petrochemical facilities have experienced tremendous growth in response to increasing demand for fuels and chemical precursors. At the same time higher expectations were established to be incompliance with corporate, local, and federal regulations. Under these circumstances it has become more challenging to keep an eye on the update and maintenance of the flare header adequacy analysis during fast paced engineering design and debottlenecking projects. This course provides the learner with skills to maintain and audit the pressure relief system design basis documentation for OSHA 1910.119 compliance

Topics
- Overview of relief disposal system design
- Global scenario identification
- Network equipment rating
- Acoustic fatigue
- Dispersion modeling
- Dynamic simulation for flare analysis
- Flare quantitative risk analysis (QRA)

1 Day | Register here | More information

Process Safety Engineering

Pressure Relief Analysis Best Practices

Course code: **OGM-PRAG1A**

Target audience
Personnel responsible for maintaining and auditing the pressure relief system design basis documentation for OSHA 1910.119 compliance. The intended audience includes auditors, process engineers, technical managers, and project managers.

Course Profile
Approximately twenty years after the initial push for compliance and the implementation of the OSHA National Emphasis Program (NEP), companies have some breathing room to apply a best practice approach to complying with PSM mandates. Those best practice approaches are covered in this course.

Topics
- Introduction and Historical Perspective
- General approach to pressure relief system design - Standardization of equipment based analysis
- Identifying and implementing RAGAGEPs
- Overpressure scenarios and required relief rates
- Relief Devices
- Overview of relief disposal system design
- Low pressure tank vents
- Relief device inspection, maintenance and removal
- Coupling PRA documentation to management of change pr**ocesses**

2 Days | Register here | More information

Process Safety Engineering

Process Safety Pressure Protection Manager

Course code: **OGM-PSPPMG1A**

Target audience
Personnel who have the responsibility of maintaining and auditing the pressure relief system design basis documentation for OSHA 1910.119 compliance. The intended audience includes auditors, process engineers, technical managers, and project managers who will be using PSPPM and #153 -

Course Profile
This 2-day course is designed to offer focused training, networking, and best practice exchange during an interactive experience with Process Safety Pressure Protection Manager (PSPPM and #153 -). It provides users of PSPPM with the skills and tools necessary to complete a pressure relief and flare analysis in PSPPM and #153 - .
The course covers navigation, data entry, scenario and global scenario identification and required rate calculations, relief devices sizing, disposal system component sizing and report generation. This course will also discuss features and customization using the tools built into PSPPM and #153 - .

Topics
- General Approach to pressure relief system design
- Navigation, interface conventions
- Site level information
- Unit/Case level information
- Data population
- Equipment related calculations
- Overpressure scenario identification
- Required rate calculations
- Relief device sizing
- Low pressure tanks
- Reporting
- Flare/Case information
- Relief header analysis overview
- Global scenario analysis summary
- Network model development
- Using PSPPM with VisualFlare/Flare System Analyzer
- Network equipment rating analysis
- Evergreening

2 Days | Register here | More information

Process Safety Management

Process Safety –
Maintenance and Inspection

Process Safety Asset Integrity Manager

Course code: **OGM-PSAIMG1A**

Target audience
This course is primarily intended for personnel who will be using or are evaluating Process Safety Asset Integrity Manager and reg - (PSAIMTM)

Course Profile
This course provides attendees with knowledge and skills to implement and utilize PSAIM and #153 – for inspection data management, monitoring corrosion rate and remaining life, scheduling activity and corrosion monitoring inspections in compliance with established inspection codes.

Topics
- Introduction
- Overview
- Master Equipment List
- Corrosion Monitoring Piping Examples
- Corrosion Monitoring Vessel Example
- Ultrasonic Data Loggers
- Corrosion Monitoring: Analytical setting and remaining life
- Corrosion Monitoring Management Reports: When & What is due?
- Inspection Activity Scheduling (Visuals, Internals, etc.)
- Inspection Reports (MS Word, .pdfs, etc.) and Recommendations
- Inspection Activity Management Reports: When & what is due?
- Equipment drawings
- Valve Testing & inspection
- Localized Corrosion - Piping
- Custom reports
- Settings (Databases)
- Database Append Cost

Process Safety –
Maintenance and Inspection

UltraPIPE

Course code: **OGM-ULPIPEG1A**

Target audience
This course is primarily intended for personnel who will be using or are evaluating UltraPIPE and reg –

Course Profile
This course provides attendees with knowledge and skills to implement and utilize UltraPIPE and reg - for inspection data management, monitoring corrosion rate and remaining life, scheduling activity and corrosion monitoring inspections in compliance with established inspection codes.

Topics
- Introduction
- Overview
- Master Equipment List
- Corrosion Monitoring Piping Examples
- Corrosion Monitoring Vessel Example
- Ultrasonic Data Loggers
- Corrosion Monitoring: Analytical setting and remaining life
- Corrosion Monitoring Management Reports: When & What is due?
- Inspection Activity Scheduling (Visuals, Internals, etc.)
- Inspection Reports (MS Word, .pdfs, etc.) and Recommendations
- Inspection Activity Management Reports: When & what is due?
- Equipment drawings
- Valve Testing & inspection
- Localized Corrosion - Piping
- Custom reports
- Settings (Databases)
- Database Append Cost

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