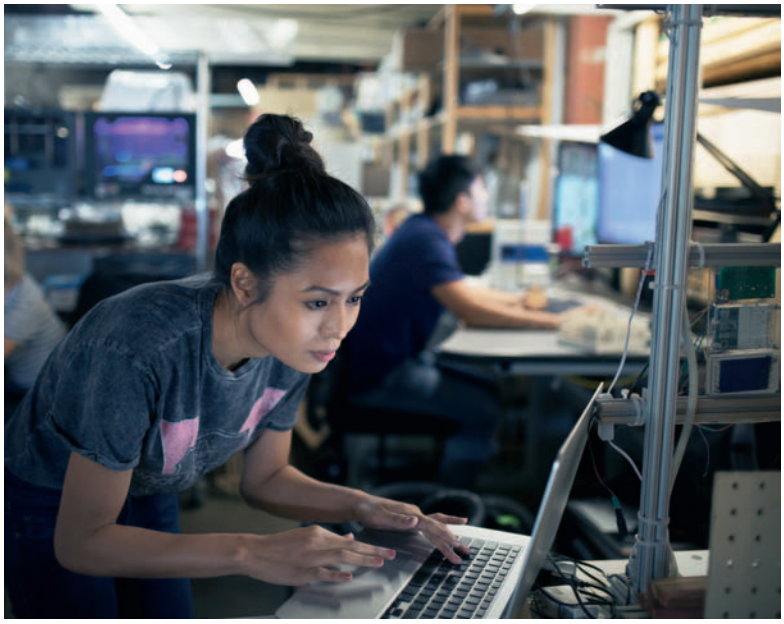
SIEMENS

Ingenuity for life

SITRAIN®–Digital Industry Academy

Course catalog

usa.siemens.com/sitrain



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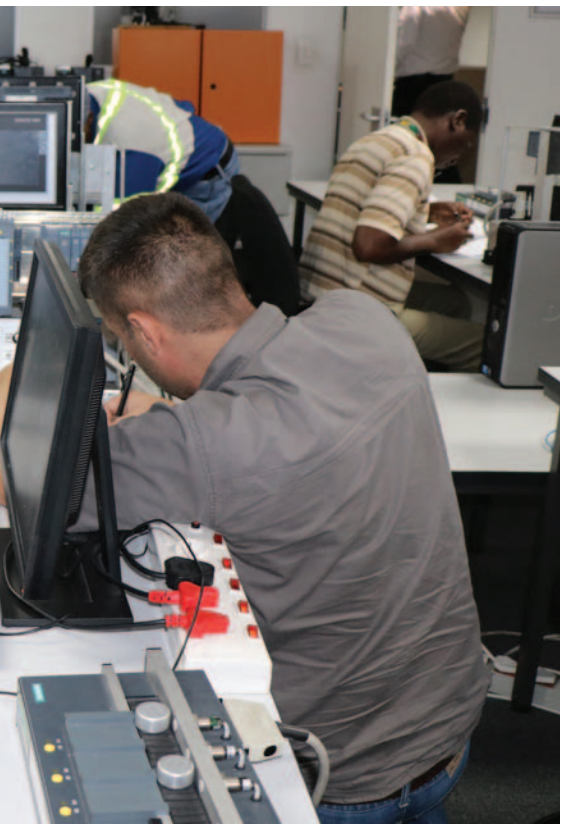

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Workforce Performance Improvement Consulting

Siemens experts can develop a comprehensive learning plan that improves productivity for your entire workforce.

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 Consulting

Siemens Workforce Performance Improvement consulting 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

SiWiz makes learning easy!

Selecting the right SITRAIN class or learning path is now easier than ever with Siemens new SiWiz Recommendation Wizard. The simple three step process makes SiWiz easy to use. Students select basic parameters based on their desired learning goals. When the learning elements are returned, students can review the information and choose a class or create a whole learning path with multiple learning elements. It's as simple as that! SiWiz does the work by pulling related learning elements together to help students create a meaningful learning path to reach their goal.

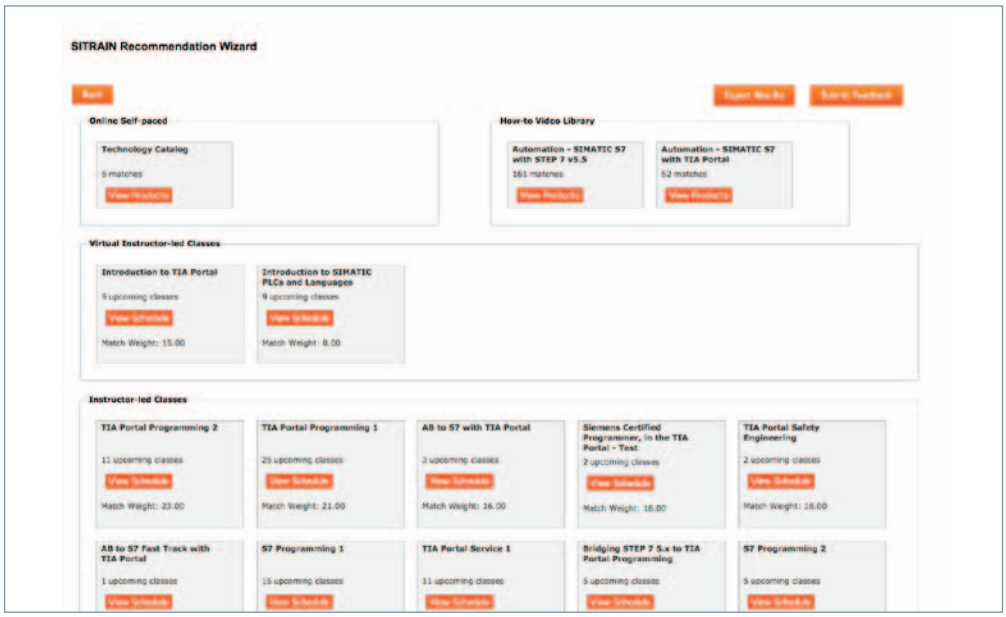
SiWiz takes the guessing out of learning.

Step 1.

Go to the SITRAIN class registration site at sitrain-lms.com and click on the button for the SiWiz tool.

Step 2.

Enter your desired parameters into SiWiz and click submit to display your results.



Step 3.

Once your information is returned, click on "view product" for detailed information. Select and register for and/or purchase your desired learning element. Add items to your shopping cart for yourself, and for others.

Micro-credentialing Program

Micro-credentialing through badging will transform the way learning achievements will be recognized in industry.

Siemens offers Continuing Education Credits (CEUs) for most of our courses.

Through SITRAIN – Digital Industry Academy Micro-credentialing Program, you can easily display knowledge and competencies to employers, colleagues, and professional organizations on your email signature, social media sites and other electronic media.

Badging Benefits

- Employers can easily track student competency badges.
- Track employee competencies across the workforce for new technologies
- Employees can digitally display competencies

How to Collect Your Badge

Once you have successfully completed your course, you will receive your Micro-credential badge. Students can easily display their achievements to get the recognition and acknowledgement they deserve for mastering defined skills and competencies. Employers can track student competencies within workforce tools.

Some currently available credentials

- S7-300 Comm Champ
- S7-300 Hardware Champ
- S7 Troubleshooting Champ
- S7-300 Comm Hotshot
- S7-300 Hardware Hotshot

ACCREDITED IACET PROVIDER

Knowledge for every need

SITRAIN offers you an all-encompassing range of options to expand your knowledge and skills, suited for every type of learner.

SITRAIN – Digital Industry Academy offers the right source of knowledge, which you can use anytime in just the way you need it. The time for learning is now.

Knowledge you can experience

We all want to learn from the best. And SITRAIN personal training courses let you benefit from the knowledge of our expert trainers with hands-on experience on Siemens equipment. It's the best way to gain knowledge - whether at your company or in our training classrooms.

Knowledge that gets you ahead

SITRAIN Access is learning in the digital age. It offers ways to build your knowledge, and access too digital training courses. Take advantage of sustainable learning success with a wide range of delivery methods. Improve your skills whenever, wherever and however you need to.

Knowledge you can always find

SITRAIN Open bundles useful information, worthwhile data and up-to-date expert knowledge about Siemens products for industry. Search it anytime, find anything - and always the right stuff.

Easy registration options!

Online – Visit sitrain-lms.com

By phone – 770-625-5644

The right learning path

Providing innovative and adaptive learning services resulting in extraordinary business performance

In today's competitive market, a highly skilled workforce is vital for success. However, understanding how to deploy an effective learning strategy is a challenge. Siemens SITRAIN learning programs offer a variety of delivery methods designed to meet every training need.

Siemens Cooperates with Education (SCE)
Initiative for universities, community colleges and K-12 schools to partner with Siemens for public education research and workforce development programs.

Siemens Mechatronic Systems Certification Program (SMSCP)
Internationally recognized, SMSCP is based on a systems approach, integrating electrical, mechanical and computer technologies.

quickSTEP courses (complimentary)
quickSTEP Introductory, web-based courses for those new to industrial technologies.

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

Online self-paced learning
Self-paced learning paths for students who need the flexibility to set their own schedule and study pace for completion.

Siemens Industry Online Services (SIOS)
Online service and support site to submit and track basic support requests. Download FAQs, manuals, tools, and more.

Virtual Instructor-led learning
Live, Instructor-led courses delivered via cloud-based format.

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

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

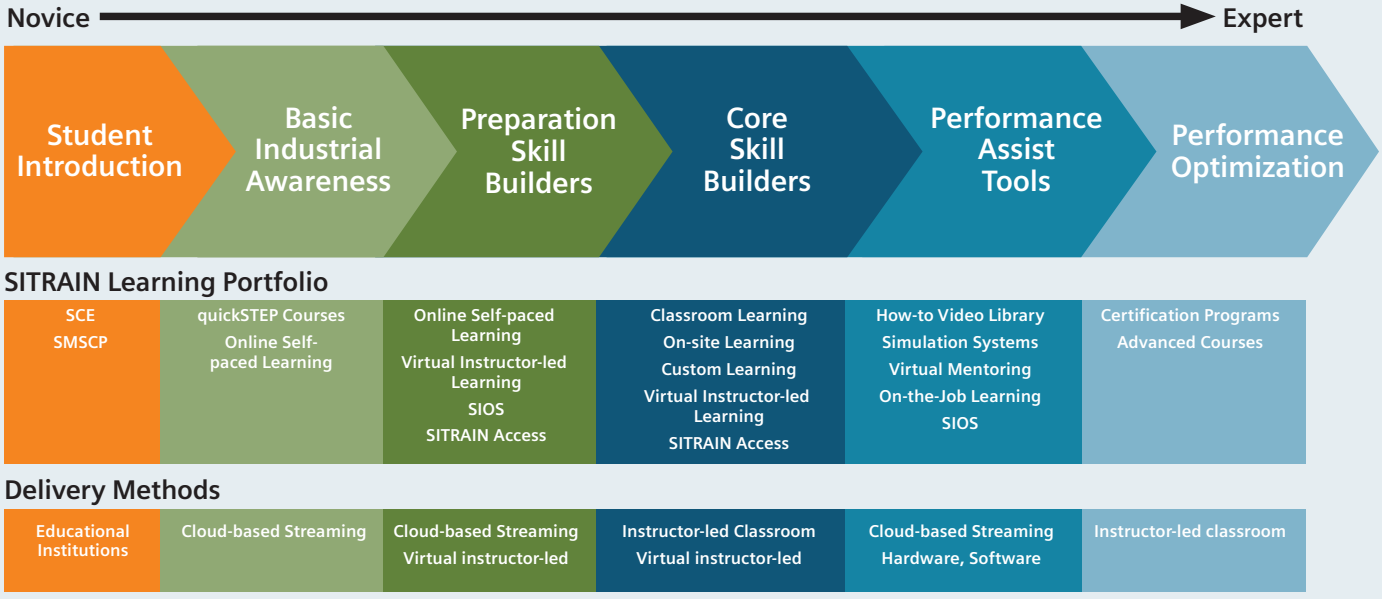
Custom learning
Audience targeted training designed for special projects, applications, or groups; custom tailored to meet your time and budget constraints.

Simulator systems
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.

Path to Skills Development



Student Introduction

Building applicable, practical know-how

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

Cooperates with Education

Automation

SIEMENS

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.

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

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

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 Didactic 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

Student Introduction

SMSCP: Siemens Mechatronic Systems Certification Program

Global skills through local engagement.

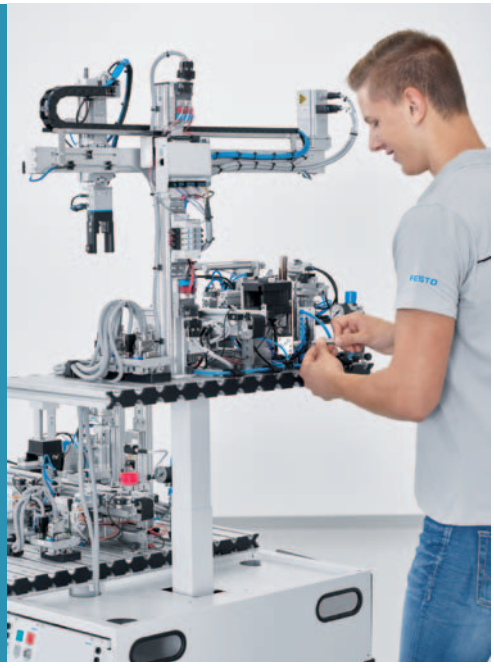
Program information

Manufacturing, packaging and other systems are becoming more complex and pervasive, and more knowledge is required to design, operate and maintain them than ever before. Complex mechatronic systems are the nexus of mechanical, electrical, and computerized technologies. There is a growing need for qualified people at all levels of your organization with up to date knowledge of integrated mechatronic systems. A world leader in mechatronic engineering, Siemens has created an industry certification program that will help students, teachers and institutions. The Siemens Mechatronic Systems Certification Program is designed to be integrated into existing forms of study, and is divided into three exam-based levels. Each level is directly tied to a job profile that clearly defines what certified personnel should be able to do.

For more information visit:

www.sitrain-learning.siemens.com

www.festo-didactic.com



Festo Didactic: Partner of choice for Siemens

Siemens is proud to partner with Festo Didactic and bring German-quality engineering to students and schools across the U.S. and globally. Through SMSCP, Siemens and Festo Didactic provide access to the industry's best trainers, sophisticated learning systems, and industry-approved curriculum. SMSCP students have the opportunity to learn in a simulated smart factory environment, working with the same equipment and problem-solving scenarios they'll encounter working for top industrial employers.

Quick entry into the technical job market

SMSCP certification levels provide clear job profiles which will help students get a foot in the door. Designed to be integrated into college or university curriculum, Siemens Professional Education Partners can integrate the certification courses into a program of study leading to an advanced degree. A foot in the door can lead to a diploma in the hand.

Internationally recognized

Regardless of where in the world you live and work, Siemens certification verifies that you have a world-class technical background.

Systems Approach

The SMSCP program is based on a systems approach. Mechatronics is not only the marriage of electrical, mechanical and computer technologies; it is also a philosophy for looking at the system. Under traditional methods of teaching mechatronics, students learn about each of these fields separately. Under the Systems Approach, students learn about the complexities of the complete system.

Basic Industrial Awareness

Preparation Skill Builders

Online Self-paced Learning – technology courses

Flexible programs to fit your schedule

Jump start your learning with Siemens online quickSTEP courses at no charge! quickSTEP offers more than 23 complimentary web-based courses to help prepare students for classroom or online courses.

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 400 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.

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

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

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

Preparation Skill Builders

Core Skill Builders

Virtual Instructor-led Learning

Classroom lectures delivered in the convenience of your home or office

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.

Our Virtual Instructor-led Learning courses give students a live, classroom experience with the convenience and cost savings of remote learning. The courses help build critical skills and knowledge. They provide hands-on instruction and live interaction as effectively as our classroom courses, while being delivered in the comfort of your office or home.

The length of each course varies depending on the content. Most courses are 4 to 5 days per week, and range from 2 to 5 hours per day. These sessions provide students with lecture, demonstration, lab exercises and Q & A presented by a Siemens certified instructor. Students will have 24-hour access to fully functional Siemens software to complete assignments via a virtual cloud-based application.

Virtual Instructor-led courses include:

- Live scheduled lectures and demonstrations
- Live group and individual Q & A session
- Fully functional automation projects using Siemens simulation tools
- Lab exercises and solution reviews
- Student and instructor desktop sharing
- Access to recorded lectures

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/VIL** to view all Virtual Instructor-led learning

Core
Skill
Builders

Classroom Learning

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

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.

For more information visit
usa.siemens.com/sitrain

We combine technology and industry experience to deliver 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

Performance Assist Tools

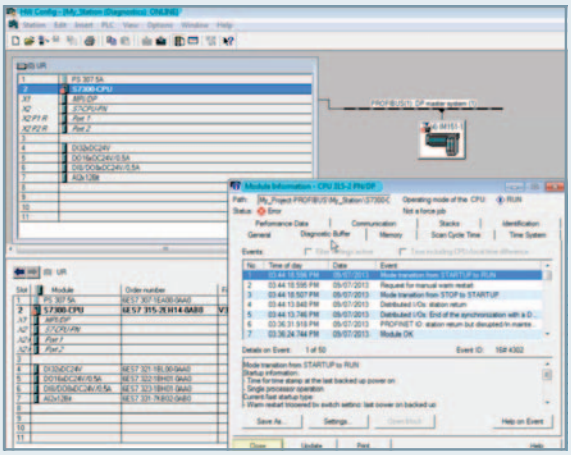
How-to Video Library

Quick, affordable, performance assist tools that cover 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.

How-to Videos

- Automation - SIMATIC S7 with STEP 7 v5.x
- Automation - SIMATIC S7 with TIA Portal
- CNC - SINUMERIK Power Line & solution line
- SINAMICS Drives
- Process Control – SIMATIC PCS7
- Even more technology categories are being added this year!



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

»A Big Three automotive customer avoided costly downtime using their Siemens SITRAIN How-to Video Library. When a main production line went down in the middle of the night, the technician pulled up the appropriate How-to Video and got the line back up and running within just a few minutes. The customer was quoted as saying that the How-to Video subscription more than paid for itself in just that one case.«

Performance Assist Tools

Simulator Systems

World-class performance assist tools available for 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.

For additional details and pricing, please call 770-625-5644 or **email: sitrain.registrar.industry@siemens.com**.

All NEW this year Virtual Machine Simulators

The online virtual machine is a web browser-based format requiring no additional software installation on the attendee's computer. Your rental includes exclusive 24-hour access to a cloud-based virtual machine identical to that used in face-to-face and virtual classroom training with all necessary software pre-loaded. Virtual Machine rental is intended for anyone who has attended Siemens Digital Industry Academy courses.

NEW Virtual Machine Simulators

Virtual Machine Simulators are available for the following classes:

- 840D / CNC SINUMERIK Solution Line
- PSC 7 V9 System Engineering
- SIMATIC BATCH V9 Engineering
- SIMATIC S7 with STEP 7 v5.5.
- SIMATIC S7 with TIA Portal
- WinCC SCADA Professional Engineering (TIA Portal)
- WinCC SCADA v7.x Engineering

Look for this icon for VMS available courses

Virtual Simulator

SIMATIC S7-1500 Training Case

Related courses: TIA Portal – All Courses
Design Includes:

- SIMATIC CPU 1513F-1 PN with PM1507, digital and analog I/Os
- ET 200SP with IM 155-6 PN, digital and analog I/Os
- TP700 Comfort Panel
- PROFINET connecting cable
- Simulator

Order number: **6ZB2310-0CW00**

SIMATIC S7-1500 Safety Training Case

Related courses: TIA Portal Safety Course
Design Includes:

- SIMATIC CPU 1513F-1 PN
- ET 200SP with IM 155-6 PN with digital F-I/Os
- TP700 Comfort Panel
- PROFINET connecting cable
- F-Simulator

Order number: **6ZB2310-0CV00**

Performance Assist Tools

SIMATIC S7-1500 Safety Periphery Training Case

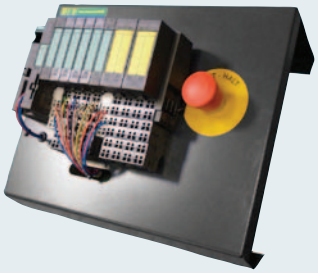
Related courses: TIA Portal Safety course
Design Includes:
- ET 200SP with IM 155-6PN with digital and analog F-I/Os
- F-Simulator
- A SIMATIC S7-1500F CPU is necessary, it is not included

Order number: **6ZB2310-0CT00**

SIMATIC S7-1200 Training Case

Related courses: S7-1200 System Course
Design Includes:
- S7-1200 Power Supply
- CPU1214
- Analog output SB1234
- Analog input / output module SM 1234
- Digital input / output module SM 1223
- Switch CSM 1277
- Basic Panel KTP600
- Interface for conveyor belt model

Order number: **6ZB2310-0CG00**



SIMATIC S7-1200 ET200S Training Module

Related courses: Optional for S7-1200 courses
Design Includes:
- Interface module IM 151-3 PN
- Power module PM-E 24 V DC
- 2 Digital input modules 4 DI × 24 V DC
- 2 Digital input modules 4 DO × 24 V DC / 0.5 A
- Power module PM-E 24V DC
- 1 Digital input modules 4/8 F-DI × 24 V DC
- 1 Digital input modules 4 F-DO × 24 V DC / 2 A
- DI/DA clamp-type terminal block, 37-pin

Order number: **6ZB2310-0CJ00**

S7-1200 Motion Control Module

Related courses: Optional for S7-1200 TIA Portal System Course
Design Includes:
- SIMATIC CPU 1211C DC/DC/DC
- Stepper motor with 360° disc and pulse encoder
- Sensor for the neutral position
- RC element with printed circuit
- 230 V AC power supply

Order number: **6ZB2310-0CP00**

SIMATIC PCS7 Training case

Related courses: SIMATIC PCS7 – All courses
Design Includes:
- Industrial PC 647D as ES/OS with a CP1623 and a standard network card for connection to a terminal bus
- PC accessories including mouse, international keyboard and 24" monitor
- AS rack with CPU 410-5H (with System Expansion Card for 100 PO) and an Industrial Ethernet CP 443-1 for connection to a system bus
- ET 200M distributed I/O for PROFIBUS with 4 signal modules (DI/DO/AI/AO), with diagnostics capability and high-precision time stamping
- ET 200M distributed I/O for PROFINET with 2 signal modules (DI/DO) connection to distributed I/O via a connecting cable and 4 front end plugs

Order number: **6ZB2320-0AN00**

SINAMICS G120 TIA with PM240 Training module

Related courses: SINAMICS G120- All courses
Design Includes:
- Power Module PM240-2 1 AC 230 V
- Control Unit CU240E-2 PN F
- Induction motor 1LA7 with encoder and brake
- Switches & LEDs for control via terminal strip
- SIMATIC S7 CPU 1211C

Upgrade set servo:
- Adapter cable for Control Unit CU305 to Sub-D
- Servo motor SIMOTICS S 1FK7
- Motor and encoder cable
- Mounting and cover
- Screws and mounting parts

Order number: **6ZB2480-0CS00**
Servo motor upgrade: **6ZB2480-0CR00**

Performance Assist Tools

SINUMERIK 840D sl Training rack

Related courses: SINUMERIK 840D sl – All courses
Design Includes:
- Simulation field incl. SIMATIC ET 200S input, output and IM modules
- OP 012 with PCU 50.5
- MCP483 IE machine control panel
- SINUMERIK 840D sl (NCU 720.3 with SW 4.x)
- NX10
- SINAMICS S120 with • ALM 16 KW, • 1-axis module 3 A, • 2-axis module 2 × 5 A
- 1 × synchronous motor 1FK7044-7AF71 with incremental encoder
- 1 × synchronous motor 1FK7060-5AF71 with absolute encoder
- 1 × standard asynchronous motor 1LA7070-4AB10 with HTL encoder
- Prepared for wiring for Safety Integrated functionality

Order number: **6ZB2410-0BM00**

SINAMICS S120 Training case

Related courses: SINAMICS S120- All courses
Connection: 230 V / 1 AC
Components:
- CU320-2 PN with CF-Card
- Smart Line Module (modified)
- Double Motor Module
- 1FK7 with incremental encoder
- 1FK7 with absolute encoder
- WITH or WITHOUT S7-1513F and memory card
- ET 200SP IM 155-6PN with I/O
- With removable operator box

Order number:
W / S7-1500T – 6ZB2480-0CN01
WO / S7-1500T – 6ZB2480-0CT00

SIMOTION D425-2 DP/PN Training case

Related courses: SIMOTION - All courses
Design Includes:
- Drive system comprising
  - SIMOTION D425-2 DP/PN control with TB30 Terminal Board
  - Smart Line Module 5 kW
  - Double Motor Module 3 A
  - 1 synchronous servo motor with incremental encoder sin/cos 1 Vpp via SMC20
  - 1 synchronous servo motor with absolute encoder 2048 and DRIVE-CLiQ interface
  - Reference disks for position monitoring
- Operator box for set-point/actual value linkage via terminals
- Connection option for an external motor, e.g. asynchronous motor

Order number: **6ZB2470-0AL01**

SINUMERIK 840D sl compact Training case

Related courses: SINUMERIK 840D sl – All courses
Design Includes:
- SINUMERIK 840D sl (NCU720.3 w/ CF card)
- SINAMICS drive for 2 axes
- 2 × 1FK7022-5AK71 servo motors with DRIVE-CliQ interface
- 1 incremental and 1 absolute measuring system
- For the software, a test rack license must be separately requested by the user of the rack.
- For operation, the training case SINUMERIK 840D sl OP is required (6ZB2410-0BL01)

Order number: **6ZB2410-0BG01**

SINUMERIK 840D sl operator panel Training case

Related courses: SINUMERIK 840D sl - All courses using 840D sl compact training case
Design Includes:
- Operating unit consisting of ITC2200, IPC427E with current SINUMERIK Operate SW
- Software SINUMERIK Operate
- Machine control panel MCP 398C with EM131
- The SINUMERIK 840D sl OP training case can only be used together with the SINUMERIK 840D sl compact training case.

Order number: **6ZB2410-0BL01**

PROFINET TIA Training module

Related courses: TIA Portal Profinet – All courses
Design Includes:
- CPU 1510SP-1 PN with digital I/Os
- PN/PN Coupler
- SCALANCE X 208

Order number: **6ZB2520-0AJ00**

Performance Optimization

Building expertise for success

Siemens certification programs

Certified expertise - Worldwide

Shorter innovation cycles combined with market pressures on productivity, cost and quality make highly skilled staff a necessity. Siemens offers training backed by certifications which enable the efficient use of Siemens automation technologies and provide an assurance of staff skills and capabilities. Having the relevant expertise is an essential prerequisite for competent, effective action, which leads to shorter commissioning times, lower maintenance expenditures, minimized downtime and much more.

Getting Started

Getting started with the Siemens Certification program is easy. Simply attend the specified courses for the desired certification path. Once complete we recommend you build applied experience on your application and have ready access to STEP 7 software for reviewing and reinforcing the subjects covered in the training courses. Continued review and practice of course materials and lab exercises are critical to passing the certification exam. The exam is a combination of written test plus hands-on with the S7 simulator systems.

Certification Program Benefits

- Flexible and confident workforce
- Proven competence
- Globally recognized credentials
- Comprehensive skill set definition

Certification Skills Summary

- Structure and create programs using complex data types, multi-instance block functionality, and indirect addressing
- Program quickly, efficiently, and safely
- Efficiently program CPU resources, communications, data passing, and integrated diagnostics
- Design program structures for automation projects

Certification Programs:

Siemens Certified Programmer - SIMATIC S7 with TIA Portal

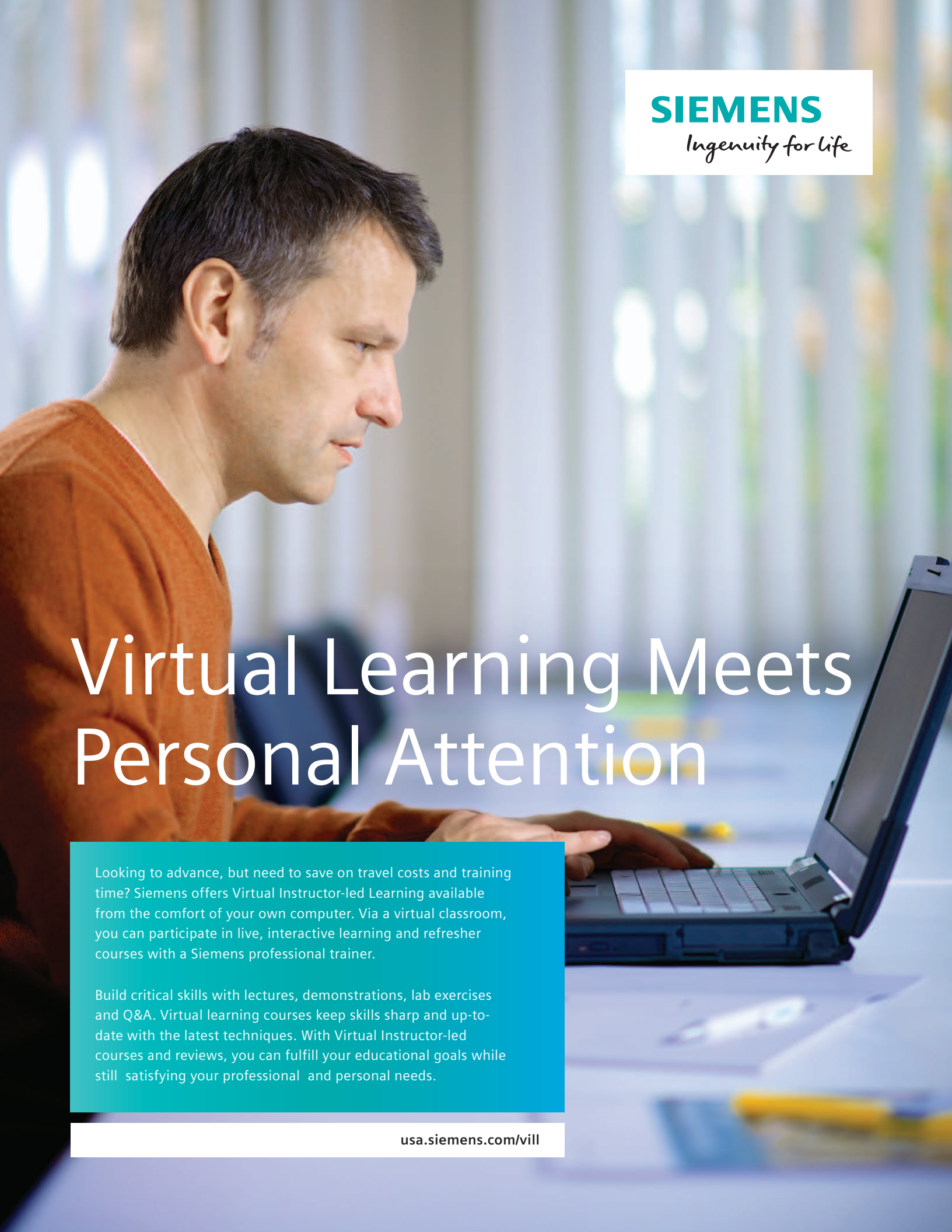
- Requires: TIA Programming 1, 2 and 3 – each class is 4.5 days in length
- Siemens certification is valid for 3 years
- Renewal requires recertification

Siemens Certified Programmer - SIMATIC S7 with STEP7 v5:

- Requires: S7 Programming 1, 2 and 3 - each class is 4.5 days in length
- Siemens certification is valid for 3 years
- Renewal requires recertification

Siemens Certified Engineer - SIMATIC PCS7

- Requires: PCS7 Systems Engineering 1 and 2, PCS7 Basic Engineer Testing, PCS7 AS-Engineering, PCS7 OS-Engineering - each class is 4.5 days in length
- Siemens certification is valid for 3 years
- Renewal requires recertification



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Key to graphic symbols

Length of course in days

Click for more information

Length of course in hours

Click for online product support

Click to register online


Foundational or prerequisite course offering

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

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

Foundation and Prerequisite training available from the **Online Self-paced Learning** *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) — Virtual Simulator — 20 HOURS
SCT-S7OILPLCI1B

S7 Automation Maintenance 1 — 4 DAYS
SCT-S7300S1C

S7 Automation Maintenance 2 — 4.5 DAYS
SCT-S7300S2C

Engineering Core

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

S7 Programming 1 — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-S7TIAP1C
SCT-S7OILTIAP1C (Virtual)

S7 Programming 2 — 4.5 DAYS
SCT-S7TIAP2B

S7 Programming 3 — 4.5 DAYS
SCT-S7TIAP3B

Certification

Siemens Certified Programmer Refresher — 4 DAYS
SCT-S7TIAR3A

Siemens Certified Programmer – Test — 1 DAY
SCT-S7TIAC3A

Advanced & Optional

S7 Programming with STL — 3 DAYS
SCT-S7STLP2B

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

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

Simulators available for SIMATIC S7 Courses

SIMATIC S7 with STEP 7 v5.5. — Virtual Simulator

See pages 15-17 for more information

VIDEO

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

Online Product Support
Industrial Automation

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming 1

Course code: **SCT-S7TIAP1C**
SCT-S7OILTIAP1C (virtual)

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 hands-on course is the first in a three part series which builds basic programming skills using Siemens STEP7 software. Students will learn S7 project management, program design and application development. This is an aggressively paced curriculum covering S7 programming with Ladder logic. The basics of programming with Function Block Diagram (FBD), Statement List (STL) languages and key software tools are also covered. Participants use Totally Integrate Automation concepts by integrating an S7300 PLC, HMI, ET200S remote I/O station and a desktop conveyor system connected by PROFIBUS.

Objectives
Upon completion of this course, the student shall be able to:
- Configure, parametrize, communicate with and commission a Totally Integrated Automation System.
- Program, document, test and troubleshoot a structured STEP7 program.
- Program using absolute and symbolic addressing.
- Use core application instructions to program Organization Blocks (OBs), Function Calls (FCs), Function Blocks (FBs), and library blocks.
- Program using binary, digital & analog processing.
- Create and use data blocks.
- Create and call reusable blocks employing parameter passing techniques.
- Cross reference where and how addressed are used, program call structure, and comparing online to offline programs.

Topics
- Using SIMATIC Manager
- Configuring the Hardware system
- Introduction to Programming
- Basic Troubleshooting Concepts
- Symbolic Addressing
- Data Blocks
- Binary Operations

Classroom Virtual

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

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

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

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

Automation – SIMATIC S7 with STEP 7 v5

S7 Programming with STL

Course code: **SCT-S7STLP2B**

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

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
- 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 – S7-300 / S7-400 / STEP 7 V5.X

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

4 Days | Register here | More information

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.

1 Day | Register here | More information

Automation

Introduction to SIMATIC PLCs and Languages (Virtual Instructor-led)

Course code: **SCT-S7OILPLCI1B**

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

10 Hours | Register here | More information | Product support

Automation

STEP 7 v5 Programming with SCL

(Classroom or Virtual Instructor-led)

Course code: **SCT-S7SCLP1A** (classroom) or
SCT-S7OILSCLP1A (virtual)

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 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 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

Classroom Virtual

Automation – TIA Portal S7-1200 / S7-1500

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

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

Maintenance

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

TIA Portal Service 1 — 4 DAYS
SCT-PTTIAS1A

TIA Portal Service 2 — 4 DAYS
SCT-PTTIAS2A

SIMATIC – Motion Control 1 in the TIA Portal — Virtual Simulator — 3 DAYS — Virtual 15 HOURS
SCT-PTTIAMC1A (Classroom)
SCT-PTOILTIAMC1A (Virtual)

SIMATIC – Motion Control 2 in the TIA Portal — Virtual Simulator — 2 DAYS — Virtual 10 HOURS
SCT-PTTIAMC2A (Classroom)
SCT-PTOILTIAMC2A (Virtual)

S7-1200 Maintenance & Engineering

S7-1200 TIA System — 4.5 DAYS
SCT-S712TP1A

Engineering Core

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

TIA Portal Programming 1 — Virtual Simulator — 4 or 4.5 — Virtual 25 HOURS
SCT-PTTIAP1A (Classroom)
SCT-PTOILTIAP1A (Virtual)

TIA Portal Programming 2 — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-PTTIAP2A (Classroom)
SCT-PTOILTIAP2A (Virtual)

TIA Portal Programming 3 — 4.5 DAYS
SCT-PTTIAP3A

TIA Portal Programming Refresher — 4 DAYS
SCT-PTTIAR1A

Siemens Certified Programmer in the TIA Portal – Test — 1 DAY
SCT-PTTIAC1A

Advanced & Optional

SIMATIC – Motion Control 1 in the TIA Portal — Virtual Simulator — 3 DAYS — Virtual 15 HOURS
SCT-PTTIAMC1A (Classroom)
SCT-PTOILTIAMC1A (Virtual)

SIMATIC – Motion Control 2 in the TIA Portal — Virtual Simulator — 2 DAYS — Virtual 10 HOURS
SCT-PTTIAMC2A (Classroom)
SCT-PTOILTIAMC2A (Virtual)

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

Online Product Support
Industrial Automation

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

Advanced & Optional (continued)

Bridging STEP 7 5.x to TIA Portal Programming
4.5 DAYS
SCT-PTTIAU2B

S7 TIA Portal Programming with SCL
Virtual Simulator
3.5 DAYS
Virtual 10 HOURS
SCT-PTOILSCLP3A (Classroom)
SCT-PTOILSCLP3A (Virtual)

TIA Portal Safety Engineering
3 DAYS
SCT-PTSFTE1A

AB to S7 with TIA Portal
Virtual Simulator
4.5 DAYS
Virtual 25 HOURS
SCT-PTABSP1A (Classroom)
SCT-PTOILABSP1A (Virtual)

TIA Portal Programming with S7 Graph
2 DAYS
SCT-PTGPHP1A

TIA Portal Safety Sustaining
2 DAYS
SCT-PTSFTP2A

Simulators available for TIA Portal Courses

All TIA Portal courses
SIMATIC S7-1500 Training Case
Order number: 6ZB2310-0CW00

SIMATIC S7-1200 Training Case
Order number: 6ZB2310-0CG00

All safety courses
SIMATIC S7-1500 Safety Training Case
Order number: 6ZB2310-0CQ00

SIMATIC S7-1500 Safety Periphery
Order number: 6ZB2310-0CT00

Optional for S7-1200 courses
SIMATIC S7-1200 ET200S Training Module
Order number: 6ZB2310-0CJ00

S7-1200 Motion Control Module
Order number: 6ZB2480-0CS00
Servo motor upgrade: 6ZB2480-0CR00

See pages 15-17 for more information

SIMATIC S7 with TIA Portal
Virtual Simulator

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

Online Product Support
Industrial Automation

Automation – TIA Portal S7-1200 / S7-1500

Automation – SIMATIC S7 with TIA Portal

AB to S7 with TIA Portal

Course code: **SCT-PTABSP1A** (classroom)

Target audience
This course is for experienced AB programmers interested in an advanced training on Siemens SIMATIC S7 PLC family and STEP7 engineering software.

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

Automation – SIMATIC S7 with TIA Portal

Introduction to TIA Portal (Virtual Instructor-led)

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 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 (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

Automation – SIMATIC S7 with TIA Portal

Bridging STEP 7 5.x to TIA Portal Programming

Course code: **SCT-PTTIAU2B**

Target audience
Experienced S7 5.x Engineering and Maintenance personnel users who are, or will be, involved with developing or sustaining TIA PORTAL projects.

Prerequisites
- SIMATIC S7 Version 5.x Project Experience
- Ver. 5.x S7 Programming 1 or S7 Tools and Troubleshooting 2 or S7 Automation Maintenance 2

Course Profile
The course begins with a brief overview of the latest SIMATIC S7-1200 and S7-1500 systems. It is followed by in- depth discussions and hands-on exercises covering, Engineering Software Framework, Network configuration, Distributed I/O, PLC Tagging, and Troubleshooting. The course covers using TIA Portal and Project tools to efficiently build a system project.

Objectives
Upon completion of this course, the student shall be able to:
- Configure the components and feature functions of the S7-1500 system.
- Navigate the STEP 7 Portal software and use the basic and advanced tool set.
- Use the STEP7 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.

Topics
- SIMATIC S7 TIA Portal overview
- Devices and Networks
- PLC Tags
- Program Blocks and Program Editor
- Advanced Programming Topics
- Troubleshooting
- Structured Control Language

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

Automation – SIMATIC S7 with TIA Portal

TIA Portal Service 2

Course code: **SCT-PTTIAS2A**

Target audience
Designed for S7-1500, S7-1200, S7-300, and S7-400, PLC users with basic SIMATIC control system knowledge who install or maintain automation systems and their application programs on the TIA Portal Platform.

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

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

Automation – TIA Portal S7-1200 / S7-1500

Automation – SIMATIC S7 with TIA Portal

TIA Portal Programming 1
(Classroom or Virtual Instructor-led)

Course code: **SCT-PTTIAP1A**
SCT-PTOILTIAP1A (virtual)

Target audience
This course is for SIMATIC S7-1500, S7-1200, S7-300, and S7-400, PLC users who are involved with developing or sustaining automation systems and their application programs.

Prerequisites
- MS Windows Expertise

Course Profile
First course in a three part series which builds basic programming skills with Siemens STEP7 TIA Portal software. Students will learn S7 project management, program design and application development. This aggressively paced curriculum covers the S7 programming editor with Ladder, Function Block Diagram, and Statement List, programming languages, and key software tools. This course takes a systems approach using the S7- 1500 PLC, plus basic connectivity and functionality of an KP700 HMI and ET200SP, 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

Classroom Virtual

Automation – SIMATIC S7 with TIA Portal

TIA Portal Programming 2
(Classroom or Virtual Instructor-led)

Course code: **SCT-PTTIAP2A**
SCT-PTOILTIAP2A (virtual)

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 1

Course Profile
Second course 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 efficiently programming the S7-1500, S7-1200, S7-300, and S7-400 PLC is covered. Integration and connectivity of PROFINET IO, HMI, and G120 Drive are the central focus of this course. Programming emphasis centers on Ladder (LAD), and Statement List (STL) logic with an introduction to Structured Control Language (SCL), and S7-GRAPH. Both direct and indirect addressing are an integral part of the course.

Objectives
Upon completion of this course, the student shall be able to:
- Leverage power of Block & 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)

Classroom Virtual

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

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

Automation – SIMATIC S7 with TIA Portal

S7 TIA Portal Programming with SCL (Classroom or Virtual Instructor-led)

Course code: **SCT-PTSCLP3A** (classroom) or **SCT-PTOILSCLP3A** (virtual)

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

Classroom Virtual

Automation – SIMATIC S7 with TIA Portal

Siemens Certified Programmer Refresher

Course code: **SCT-PTTIAR1A**

Target audience
This course is intended for experienced STEP 7 TIA Portal 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 Portal Programming 1
- S7 TIA Portal Programming 2
- S7 TIA Portal Programming 3

Course Profile
This is a 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-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 – TIA Portal S7-1200 / S7-1500

Automation – SIMATIC S7 with TIA Portal

Siemens Certified Programmer – Test

Course code: **SCT-PTTIAC1A**

Target audience
This Siemens PCS7 Certified Engineer Test is intended for experienced STEP 7 TIA Portal programmers who have met the prerequisites below.

Prerequisites
- Advanced Programming Experience
- S7 TIA Portal Programming 1
- S7 TIA Portal Programming 2
- S7 TIA Portal 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 Portal 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).

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.

2 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

TIA Portal Programming with S7 Graph

Course code: **SCT-PTGPHP1A**

Target audience
This course is for SIMATIC S7-1500 PLC users involved in developing or sustaining automation systems that use of S7 Graph.

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

Course Profile
This course concentrates on the S7 GRAPH programming language with a review of the S7 block architecture focusing on the Function Block and the Instance Data Block.

The STEP 7 TIA Portal software tools and S7 GRAPHprogramming elements structure are introduced within the course to guide the student through the development of a realistic application. The use of test, debug and diagnostic tools complete the programming exercises.

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.

Topics
- S7 GRAPH Programming Elements
- Principles of S7 GRAPH Programming
- S7 GRAPH Program Structures
- Interaction with Other Program Modules
- Documentations and Storage

2 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

TIA Portal Safety Sustaining

Course code: **SCT-PTSFTP2A**

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

Prerequisites
- MS Windows Expertise
- TIA Portal Programming 1
  OR
- TIA Portal Service 1 AND TIA Portal Service 2

Course Profile
1.3 CEUs (Continuing Education Credits)
This course introduces the Siemens Distributed Safety PLC application and build skills on commissioning, troubleshooting and upgrading an automation safety system. Also covered are functional safety principles, sensor-actuator connections, device configuration of the S7-1500F and ET 200SP, restoring the system and programming the safety blocks.

Objectives
Upon completion of this course, the student shall be able to:
- Describe global and US Machine Safety Standards.
- Identify TIA Portal safety components.
- Remove and replace S7-1500 and ET200SP safety components.
- Identify safety components using the wiring diagrams of the S7-1500 and ET200SP.
- Configure S7-1500 safety component hardware.
- Diagnose S7-1500 safety component LEDs.
- Address S7-1500 safety components.

Topics
- Overview Machine Safety Standards
- Product Overview
- Functional Safety Integrated Principle
- Sensor-actuator connection
- Device Configuration
- Configuring and wiring the S7-1500F and ET200SP
- System Restore and Safety Blocks Programming
- Testing and Diagnostics
- Fail-safe communication

2 Days | Register here | More information

Automation – SIMATIC S7 with TIA Portal

SIMATIC – Motion Control 1 in the TIA Portal

(Classroom or Virtual Instructor-led)

Course code: **SCT-PTTIAMC1A** (classroom)
SCT-PTOILTIAMC1A (virtual)

Target audience
This course is for Programming and/or Commissioning Engineers who are responsible for maintaining systems with Siemens motion-based controls ystems.

Prerequisites
- TIA Portal Programming 1 or TIA Portal Service 2

Course Profile
In this technology course, attendees will program the SIMATIC S7-1500 or S7-1200 controllers in the TIA Portal. They will be able to precisely control the motion of axes with the integrated motion control functions while learning step by step the benefits and use of these functions.

Each learner will be able to select and configure appropriate technology objects, such as speed axis, positioning axis and synchronous axis, as well as, integrate them into the program. In the SCT-PTTIAMC2A course, learners will work with the T-CPU and learn the benefits of functions such as absolute synchronous operation and camming.

Objectives
Upon completion of this course, the student shall be able to:
- Control the motion of axes with the integrated motion control functions.
- Interpret the interaction of the technological functions.
- Commission the SINAMICS servo controller for use in the TIA Portal.
- Select and configure appropriate technology objects, such as: speed axis positioning axis, synchronous axis and integrate them into a program.

Topics
- Basics of motion control
- Speed Axis technology object
- Positioning Axis technology object
- Homing and traversing movements
- Programming with PLC open
- Output cam and measuring input
- Closed-loop control and optimization
- Synchronous Axis technology object

Classroom Virtual

Automation – SIMATIC S7 with TIA Portal

SIMATIC - Motion Control 2 in the TIA Portal

(Classroom or Virtual Instructor-led)

Course code: **SCT-PTTIAMC2A** (classroom)
SCT-PTOILTIAMC2A (virtual)

Target audience
This virtual course is for Programming and/or Commissioning Engineers who are responsible for maintaining systems with Siemens motion-based control systems.

Prerequisites
- SIMATIC – Motion Control 1 in the TIA Portal (SCT-PTTIAMC1A) - Virtual or Classroom

Course Profile
Using the motion control functions of the SIMATIC S7-1500 technology CPU, students will be able to extend applications with absolute synchronous axes or camming. Additionally, students will deepen their knowledge through virtual programming exercises.

During the course, access to fully functional software,virtual tools, and exercises are provided to each participant through a cloud-based application. After completing the course, the learners understand how camming works and can efficiently assign parameters for technology objects.

Objectives
Upon completion of this course, the student shall be able to:
- Use the SIMATIC S7-1500 controller to extend applications with absolute synchronous axes or camming using motion control functions.
- Interpret the interaction of the technological functions
- Select and configure appropriate technology objects, such as: speed axis positioning axis, synchronous axis and integrate them into a program.

Topics
- Overview of S7-1500T Technology CPUl
- Absolute and relative gearing
- Strategies for synchronization and desynchronization
- Cam disc creation using the graphical cam editor
- Kinematic functions configuration and control
- Interplay between Motion Control and Safety Integrated
- Cam disc creation using libraries

Classroom Virtual

Automation – SIMATIC HMI / SIMATIC HMI with TIA Portal

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

Foundation and Prerequisite training available from the **Online Self-paced Learning** *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) — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-PTWCSP1A (Classroom)
SCT-PTOILWCSP1A (Virtual)

SiVArc – Automatic Visualization Generation — 1 DAY
SCT-SIVARC-1

WinCC Comfort/Advanced

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

TIA Portal WinCC Comfort / Advanced Panel Electrical Maintenance — 2 DAYS
SCT-PTWCPO1A

TIA Portal WinCC Comfort / Advanced Panel Basic Operations — 1 DAY
SCT-PTWCMO1A

Classic

WinCC SCADA

SIMATIC WinCC SCADA Engineering — Virtual Simulator — 4 DAYS — Virtual 16 HOURS
SCT-S7WINI2A (Classroom)
SCT-S7OILWINI2A (Virtual)

SIMATIC WinCC SCADA Sustaining — 4.5 DAYS
SCT-S7WINM1A

WinCC Flexible

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

WinCC Flexible with HMI Lite — 3 DAYS
SCT-S7TLWM1A

Simulators available for SIMATIC HMI / SIMATIC HMI with TIA Portal

TIA Portal Courses
SIMATIC S7-1500 Training Case
Order number: 6ZB2310-0CW00

WinCC SCADA Professional Engineering (TIA Portal) — Virtual Simulator

S7 Classic Courses
SIMATIC S7 Training Case
S7-300 TIA
Order number: 6ZB2310-0CK00
(with control panel)
Order number: 6ZB2310-0CM00
(with comfort panel)

WinCC SCADA v7.x Engineering — Virtual Simulator

See pages 15-17 for more information

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

Online Product Support
Industrial Automation

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

WinCC Flexible with HMI Lite

Course code: **SCT-S7TLWM1A**

Target audience
This course is for users who develop, install or maintain automation systems and their application programs when using the Siemens HMI Lite automation concept and the HMI Lite automation concept for SINUMERIK systems.

Prerequisites
- S7 Programming 1; OR
- S7 Automation Maintenance 1 & S7 Automation Maintenance 2; OR
- S7 System Tools and Troubleshooting 1 & S7 System Tools and Troubleshooting 2

Course Profile
2.9 CEUs (Continuing Education Credits)
Developed for the Automotive Industry, the HMI Lite concept is adaptable to any automation solution. The Siemens' SIMATIC®, SINUMERIK®, and SINAMICS® product lines are the basis of this concept. When HMI Lite is selected as the automation solution, the Siemens staff develops the desired automation solution, including the communications, software, engineering, training, spare parts and service, tailored to the respective production areas and to the specific project requirements.

Objectives
Upon completion of this course, the student shall be able to:
- 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 the HMI Lite concept - user's respective production area.
- Understand the HMI Lite SIMATIC S7 program structure - logic and data blocks, symbols, project documentation.
- Be able to download a HMI Lite Project; cALL and format a standard HMI Lite block.
- Create an Operator Prompt Message and the logic code to activate the Message.

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

Automation - SIMATIC HMI

SIMATIC WinCC SCADA Engineering

Course code: **SCT-S7WINI2A** (classroom)
SCT-S7OILWINI2A (virtual)

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

Classroom Virtual

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

Automation – SIMATIC HMI with TIA Portal

TIA Portal WinCC Professional Configuration (SCADA)

Course code: **SCT-PTWCSP1A** (classroom)
SCT-PTOILWCSP1A (virtual)

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

Classroom Virtual

Automation – SIMATIC HMI with TIA Portal

SIMATIC WinCC SCADA Sustaining

Course code: **SCT-S7WINM1A**

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

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

Course Profile
2.9 CEUs (Continuing Education Credits)
Using a simulated WinCC (Plant) Project, this course provides a system overview of WinCC with emphasis on typical maintenance-related procedures and tools. Detailed maintenance configuration procedures will be studied in an order compatible with a typical industrial application. Students will learn the correct troubleshooting and corrective action configuration procedures beginning with modifying a project and concluding with archiving, reporting, and printing procedures. Throughout this course lecture, materials are complimented with hands-on exercises to challenge participants on a live simulated plant (WinCC) project.

Objectives
Upon completion of this course, the student shall be able to:
- Troubleshoot and manage WinCC Projects.
- Modify components between WinCC and Step 7.
- Edit/Create WinCC tags STEP 7 symbol table.
- Troubleshoot communications with the PLC.
- Create common plant graphics.
- Create C/VB scripts for animation & system control.
- Configure internal and external tags.
- Modify and Administer User Security.
- Create and test the WinCC Alarms & Messages.
- Configure, archive and display Trends & Tables.

Topics
- WinCC System Overview and Requirements
- WinCC Core Functionality
- System Configurations

Automation – SIMATIC HMI with TIA Portal

TIA Portal WinCC Comfort / Advanced Panel Electrical Maintenance

Course code: **SCT-PTWCPO1A**

Target audience
For manufacturing Electrical Maintenance staff responsible for maintaining and troubleshooting a control system application configured with SIMATIC TIA Portal WinCC Advanced software. *NOTE: Course is for operating Panels and/or Machine mounted HMI.

Prerequisites
- Basic knowledge of automation technology.

Course Profile
This course provides a foundational overview of the features and capabilities of Siemens SIMATIC TIA Portal WinCC Comfort Panel and engineering software. Students will build skills with user management tools including alarms, messaging, security and tag access.

Objectives
Upon completion of this course, the student shall be able to:
- Modify a WinCC Advanced project.
- Applying tags to screen objects.
- Utilize graphic screens and tools.
- View internal and external tags.
- Set/test the fundamentals of Alarms and Messages.
- Archive and display trends.
- Understand a basic recipe and it's operation.

Topics
- WinCC Advanced System Overview
- Introduction to the Engineering Software
- Modify and download a Project
- Basic Graphics Design
- Advanced Configuration Principles

Automation – SIMATIC HMI with TIA Portal

SiVArc – Automatic Visualization Generation

Course code: **SCT-SIVARC-1**

Target audience
This course is for automation system design managers, project managers, programmers, configuration and commissioning engineers.

Prerequisites
- TIA Portal WinCC Advanced

Course Profile
0.6 CEUs (Continuing Education Credits)
The objective of this course is to standardize the visualization of user interfaces throughout the plant while reducing engineering overhead. This is accomplished with automatic generation and creation of an operator control and monitoring solution, based on the program code of the controller and corresponding visualization objects as part of the comprehensive library concepts. The basics and the various options and concepts offered by SiVArc are covered, along with configuration of a visualization generation. A standardized PLC project will form the basis for creating the visualization generation.

Objectives
Upon completion of this course, the student shall be able to:
- Identify SiVArc option and concepts
- Configure rule-based HMI screen generation
- Add dynamics to automatically generated screens
- Reinforce theoretical knowledge
- Generate a complete visualization

Topics
- Introduction
- Generating objects and screens
- Dynamizing objects
- Positioning objects
- Reusing library objects
- Conclusion

Automation – SIMATIC HMI with TIA Portal

TIA Portal WinCC Comfort / Advanced Panel Basic Operations

Course code: **SCT-PTWCMO1A**

Target audience
For manufacturing Operations staff responsible for operating a control system application configured with SIMATIC TIA Portal WinCC Advanced software. *NOTE: Course is for operating Panels and/or Machine mounted HMI.

Prerequisites
- Basic knowledge of automation technology.

Course Profile
Course provides a foundational overview of the features and capabilities of Siemens SIMATIC TIA Portal WinCC Comfort Panel. Students will be able to restore and operate a SIMATIC Comfort Panel. Students will build skills by viewing and managing alarms. Complimentary materials and hands-on exercises demonstrate how to operate SIMATIC TIA Portal WinCC Comfort panel.

Objectives
Upon completion of this course, the student shall be able to:
- Practice various operations of the HMI panel
- Set date and time on the HMI panel
- Navigate between screens
- Calibrate the HMI panel
- View and manage alarms
- Operate user security features.

Topics
- Open a project
- Backup/Restore HMI
- Download HMI project
- Adopt CPU time
- Calibrate screen
- Operate an Alarm Window & view

Automation – NETWORKING

Learning Map

Core Courses: Classroom; Classroom & Virtual; Virtual

Optional / Advanced Courses: Classroom; Classroom & Virtual; Virtual

Reinforcement: How to & support

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

Maintenance

PROFINET with Industrial Ethernet — 4 DAYS

SCT-PTTIAPNA

Engineering Core

SIMATIC NET PROFIBUS, Ethernet, PROFINET — 4.5 DAYS

SCT-S7NETS1A

Simulators available for networking

S7 Classic
PROFINET Training Case
Order number: 6ZB2520-0AG02

TIA Portal
PROFINET TIA Training module
Order number: 6ZB2520-0AJ00

See pages 15-17 for more information

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

Online Product Support
Industrial Automation

Automation – TIA PORTAL

PROFINET with Industrial Ethernet

Course code: **SCT-PTTIAPNA**

Target audience
This course is for PLC users with programming, engineering or maintenance experience who will be maintaining automation systems and their PROFINET networks in the TIA Portal.

Prerequisites
- TIA Portal Service2 OR
- TIA Portal Programming1 (or Bridging STEP 7 5.x to TIA Portal Programming)

Course Profile
Siemens, a member of PROFIBUS International (PI), offers you the opportunity to learn about PROFINET, the open Industrial Ethernet standard for automation. Using SIMATIC NET components, you will learn how to parameterize, commission and troubleshoot a PROFINET network quickly and effectively. Numerous practical exercises reinforce the acquired theoretical knowledge

Objectives
Upon completion of this course, the student shall be able to:
- Troubleshoot/manage PROFINET networks.
- Configure and program using PROFINET IO.
- Commission media redundancy.
- Utilize integrated Web-services in PROFINET devices.
- Use and configure Shared Device.
- Parameterize/utilize applications of I-Device.
- Parameterize/utilize Links (PN/PN coupler).
- Configure an S7 connection and program using the S7 communication blocks, PUT/GET, SEND/RECEIVE.
- Configure Ethernet connections (ISO on TCP, TCP, UDP) and program using the T-communication blocks, T-SEND/T-RECEIVE

Topics
- Basics of Industrial Ethernet and PROFINET
- Overview of Network Components / SIMATIC NET Selection Tool (SCALANCE S/W)
- Commissioning a PROFINET IO Device
- Topology Editor
- Diagnostics

Digital Enterprise

Learning Map

Core Courses: Classroom; Classroom & Virtual; Virtual

Optional / Advanced Courses: Classroom; Classroom & Virtual; Virtual

Reinforcement: How to & support

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

Digital Enterprise Courses

SIMIT Simulation with PCS7 — 3 DAYS
SCT-PCSMIT1A

SiVArc – Automatic Visualization Generation — 1 DAY
SCT-SIVARC-1

TIA in the Digital Enterprise Introduction Compact
Coming Soon

TIA in the Digital Enterprise Intro to Standardization
Coming Soon

TIA in the Digital Enterprise Automatic Execution of Engineering Tasks
Coming Soon

Virtual Commissioning for Machines
Coming Soon

TIA Portal Openess Programming 2
Coming Soon

Process Automation - PCS7

SIMIT Simulation with PCS7

Course code: **SCT-PCSMIT1A**

Target audience
Decision makers, sales personnel, Project manager, project staff, configuring engineers, programmer.

Prerequisites
- Basic automated controls experience
- Practical experience in SIMATIC PCS 7 project engineering and APL blocks
- Solid computer skills

Course Profile
This course provides a summary of the functions and libraries of the simulation software SIMIT. By practical exercises you will learn about the design of simulations / simulation models for testing the PCS 7 automation software. The integration of all components in SIMIT enables you to produce more in the highest quality durably and to establish new products on the market faster.

Objectives
Upon completion of this course, the student shall be able to:
- Create your own components and templates.
- Use the available features for efficient engineering in SIMIT.
- Establish couplings between the simulation in SIMIT and automation systems in PCS 7.
- Emulate the CPU using PLCSIM or the Virtual Controller option of SIMIT.

Topics
- Introduction
- PCS 7 Documentation and Online Support
- The first SIMIT Project
- SIMIT at a glance
- Interfacing with automation via PLCSIM
- Interfacing with automation via Virtual Controller
- Simulation of the device level
- Introduction to process simulation
- User-specific macros and components
- Process simulation with FLOWNET and CHEM-BASIC
- Scripting

Automation – SIMATIC HMI with TIA Portal

SiVArc – Automatic Visualization Generation

Course code: **SCT-SIVARC-1**

Target audience
This course is for automation system design managers, project managers, programmers, configuration and commissioning engineers.

Prerequisites
- TIA Portal WinCC Advanced

Course Profile
0.6 CEUs (Continuing Education Credits)
The objective of this course is to standardize the visualization of user interfaces throughout the plant while reducing engineering overhead. This is accomplished with automatic generation and creation of an operator control and monitoring solution, based on the program code of the controller and corresponding visualization objects as part of the comprehensive library concepts. The basics and the various options and concepts offered by SiVArc are covered, along with configuration of a visualization generation. A standardized PLC project will form the basis for creating the visualization generation.

Objectives
Upon completion of this course, the student shall be able to:
- Identify SiVArc option and concepts
- Configure rule-based HMI screen generation
- Add dynamics to automatically generated screens
- Reinforce theoretical knowledge
- Generate a complete visualization

Topics
- Introduction
- Generating objects and screens
- Dynamizing objects
- Positioning objects
- Reusing library objects
- Conclusion

Digital Enterprise

NEW Digital Enterprise

TIA in the Digital Enterprise Introduction Compact

Coming soon

An introduction into the TIA in the Digital Enterprise including:
- Digitalization - Industry 4.0
- Automatic execution of engineering tasks
- PLM-integration of automation engineering
- Efficient cloud-based engineering
- Virtual commissioning

NEW Digital Enterprise

TIA in the Digital Enterprise Introduction to Standardization

Coming soon

This course will explore the standardization of measures, types and procedures in industrial applications:
- Standardization
- Benefits of standardizing the PLC software
- Library concepts in TIA Portal
- Opportunities for implementing a standard

NEW Digital Enterprise

TIA in the Digital Enterprise Automatic Execution of Engineering Tasks

Coming soon

In this course you will be able to accomplish the following engineering tasks:
- Write a simple script
- Understand a project generator
- Explain Openness API of the TIA Portal
- Know project, hardware and software generation principles
- Import and export hardware data

NEW Digital Enterprise

Virtual Commissioning for Machines

Coming soon

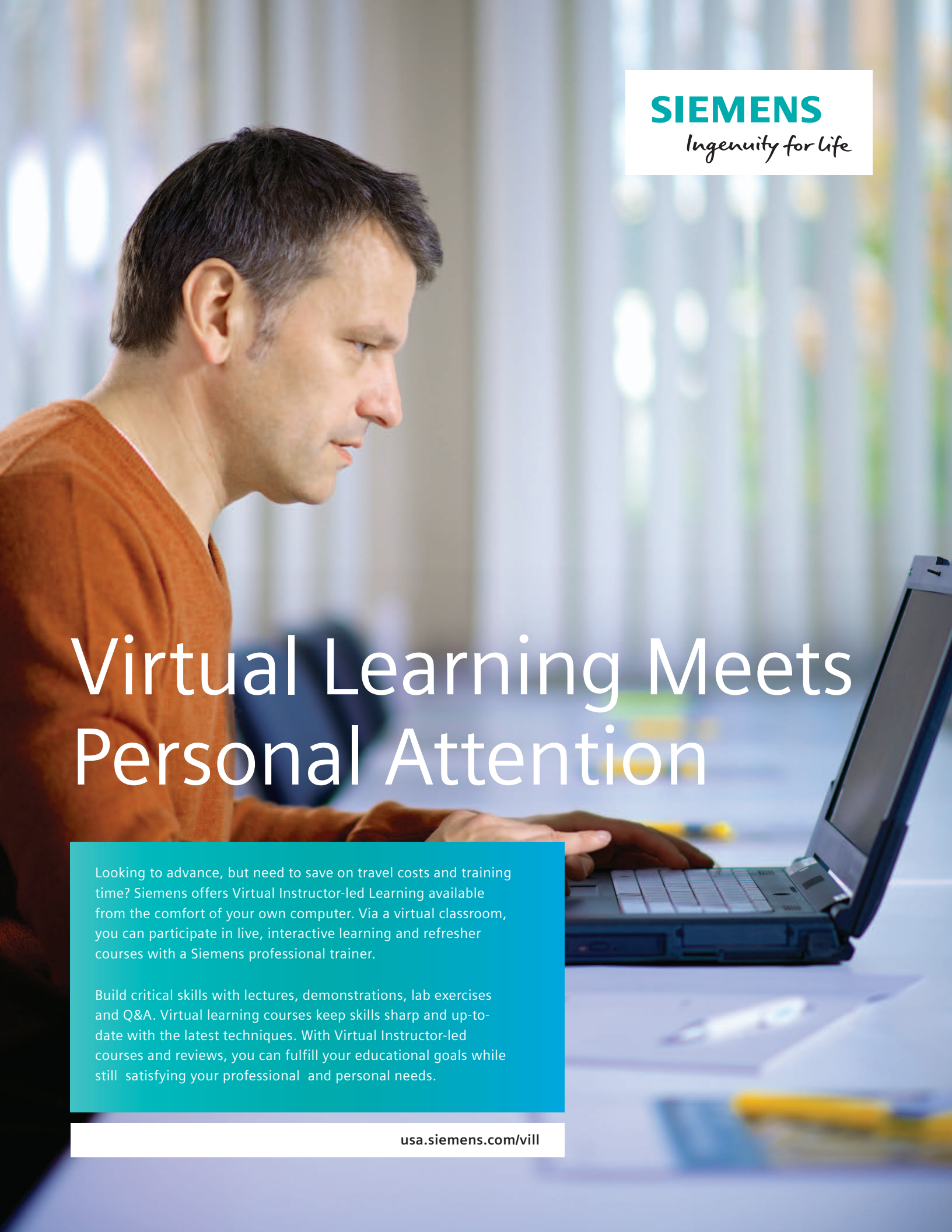
An overview of the interaction among the various software packages such as NX, MCD, TIA Portal, PLCSIM Advanced and SIMIT.
- Concept Introduction
- PLCSIM Advanced and TIA Portal
- Introduction to NX and MCD
- Creating drawings in the NX CAD system
- Introduction of SIMIT

NEW Digital Enterprise

TIA Portal Openess Programming 2

Coming soon

Efficiently automate engineering tasks through the API / interface provided with TIA Portal.
- Create a project
- Create and adapt S7-1500 with central and distributed I/O
- Provide an HMI with a variety of screens
- Generate a PLC program
- Fill the devices with the generated data



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Machine Tool – Power Line / HMI Advanced

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

Foundation and Prerequisite training available from the **Online Self-paced Learning** *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-S7TIAP1C

↓

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-S7TIAP1C

↓

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

↓

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

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

Online Product Support
SINUMERIK CNC

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

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

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

Machine Tool – Power Line / HMI Advanced

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 | Product support

SIEMENS
Ingenuity for life

SITRAIN How-to Video Library makes machine side learning simple

Siemens How-to Video Library consists of ***short*** (3 minutes on average), on-demand videos refreshing specific tasks and skills acquired during a SITRAIN instructor-led class. Each video is developed by a skilled training professional and offer a high impact experience designed to refresh individuals on industrial automation skills and job-related tasks. These How-to Videos provide on-demand, self-paced instruction for all experience levels. They are viewable in various formats, including mobile devices, providing you with ***instant access*** right ***at the machine location***.

Hundreds of technology topics, such as:

- Automation - SIMATIC S7 with STEP 7 v5.5
- Automation - SIMATIC S7 with TIA Portal
- CNC - SINUMERIK Power Line
- CNC - SINUMERIK Solution Line
- Process Control - SIMATIC PCS 7
- Variable Speed Drives

Subscription package options:

- 1 User/1, 3, 6, 12 or 24 months
- 1 User/Bundle Price Access Entire Library

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How-to Video Library mobile app?

Go to the iTunes App Store, search for "Siemens Video" or "Video Refresher" and download the app for use on your iOS devices.

Machine Tool – Solution Line / HMI Advanced / HMI Operate

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

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

840D Solution Line HMI Advanced Maintenance

S7 Programming 1 — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-S7TIAP1C
SCT-S7OILTIAP1C

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 Advanced Operator

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

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

840Dsl Maintenance 2 w/ HMI Advanced — Virtual Simulator — 4.5 DAYS
SCT-SN84SM2A

840D Solution Line HMI Operate Maintenance

S7 Programming 1 — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-S7TIAP1C
SCT-S7OILTIAP1C

840Dsl Maintenance 1 w/ Operate — 4.5 DAYS
SCT-SNSLM1A-OP

840Dsl Maintenance 2 w/ Operate — 4.5 DAYS
SCT-SNSLM2A-OP

840D Solution Line HMI Operate Operator

840Dsl Operations & Programming 1 w/ HMI Operate — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-SNSLP1A-OP
SCT-SNOILSLP1A-OP

840D Safety Integrated OEM

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

Online Product Support
SINUMERIK CNC

840D Safety Integrated Maintenance

S7 Programming 1 — Virtual Simulator — 4.5 DAYS — Virtual 25 HOURS
SCT-S7TIAP1C
SCT-S7OILTIAP1C

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

Simulators available for Machine Tool courses

S7 Programming 1 Course
S7 Training case
Order number: 6ZB2 310-0CM00

SIMATIC S7 with TIA Portal — Virtual Simulator

All SINUMERIK 840Dsl courses
SINUMERIK 840D sl Training rack
Order number: 6ZB2470-0AL01

SINUMERIK 840D sl compact Training case
Order number: 6ZB2410-OBG01

SINUMERIK 840D sl operator panel Training case
Order number: 6ZB2410-0BK00

840D / CNC SINUMERICK Solution Line — Virtual Simulator

See pages 15-17 for more information

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

CNC – SINUMERIK Solution Line

840Dsl Operations & Programming 1 w/HMI Operate

Course code: **SCT-SNSLP1A-OP**
SCT-SNOILSLP1A-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.

Classroom Virtual

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

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 – SINAMICS / SIMOTION / SIMATIC

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

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

SIMOTION Maintenance

SIMOTION System Maintenance — 4.5 DAYS
SCT-DVMSYM1A

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

SIMATIC - Motion Control

SIMATIC – Motion Control 1 in the TIA Portal — Virtual Simulator, 3 DAYS, Virtual 15 HOURS
SCT-PTTIAMC1A (Classroom)
SCT-PTOILTIAMC1A (Virtual)

SIMATIC – Motion Control 2 in the TIA Portal — Virtual Simulator, 2 DAYS, Virtual 10 HOURS
SCT-PTTIAMC2A (Classroom)
SCT-PTOILTIAMC2A (Virtual)

SINAMICS Certifications

SINAMICS G120 Certification — 2.5 DAYS
SCT-DVSNAG1A

SINAMICS S120 Certification — 2.5 DAYS
SCT-DVS12C1A

SINAMICS Engineering and Maintenance

SINAMICS S Setup & Maintenance — 4.5 DAYS
SCT-DVSNAM1A

SINAMICS S120/G120 Maintenance & Troubleshooting — 4.5 DAYS
SCT-AUSNSM1A

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 1st Responder Maintenance

SINAMICS Drives Introduction — 2 DAYS
SCT-DVSINM1A

SINAMICS G120 Basic Maintenance — 2.5 DAYS
SCT-DVG12M1A

SINAMICS S120 Basic Maintenance — 2.5 DAYS
SCT-DVS12M1A

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

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

Simulators available for drives and motion courses

All SIMOTION courses
SIMOTION D425-2 DP/PN Training case
Order number: 6ZB2470-0AL01

All SINAMICS G120 courses
SINAMICS G120 TIA with PM240 Training module
Order number: 6ZB2480-0CS00
Servo motor upgrade: 6ZB2480-0CR00

All SINAMICS S120 courses
SINAMICS S120 Training case
Order number:
W / S7-1500T – 6ZB2480-0CN01
WO / S7-1500T – 6ZB2480-0CT00

All SINAMICS 6RA80 DCM courses
SINAMICS DCM Training case
Order number: 6RX1800-0SM00

SIMATIC S7 with TIA Portal — Virtual Simulator

See pages 15-17 for more information

VIDEO

How to Video Library
Reinforces learning in Low-voltage Drives.

Online Product Support
Drive Technology

Drives & Motion – SINAMICS / SIMOTION / SIMATIC

Drives

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

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

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

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
- STRONG RECOMMENDATION: SINAMICS S Setup and Maintenance (SCT-DVSNAM1A) is 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

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
- Basic computer skills
- Basic Industrial Electronics experience

Course Profile
This course is intended for sustainers of Siemens motion based systems. The goal of this course is to build foundation skills for quick diagnostics, troubleshooting and repair of the motion system controls. Students will learn the system hardware, basic software tools and communications to a level necessary to troubleshoot common problems and support system commissioning and operation.

Objectives
Upon completion of this course, the student shall be able to:
- Commission a SINAMICS S120 drive controller for use with SIMOTION.
- Navigate a typical motion systems project and use the software tools, documentation and help system for efficient troubleshooting.
- Perform project backup and restoration, and firmware migration.
- Properly utilize the various types of motion system tasks, such as the background task, interrupt tasks, cyclic tasks, fault tasks and motion tasks.

Topics
- SINAMICS Family Overview
- Commissioning and Diagnostic Tool Scout
- SINAMICS Commissioning
- Totally Integrated Automation
- Analog & Set-point Channels and Control loops
- Closed Loop Control
- The SIMOTION System
- Starting up the SIMOTION control
- Programming in MCC and ladder and testing simple user programs
- Using IT DIAG

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

Drives & Motion – SINAMICS / SIMOTION / SIMATIC

Drives - SINAMICS

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

SINAMICS 6RA80 DCM Set-up & 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

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

Drives - SINAMICS

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

Drives - SINAMICS

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

Drives - SINAMICS

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 Learning, 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

Drives & Motion – SINAMICS / SIMOTION / SIMATIC

Drives - SINAMICS

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 Learning, 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 - SINAMICS

SINAMICS S120/G120 Maintenance and Troubleshooting

Course code: **SCT-AUSNSM1A**

Target audience
This course is for personnel responsible for the long term maintenance and diagnostics of the SINAMICS S120 and G120 drive systems.

Prerequisites
- Basic computer skills
- Basic Industrial Electronics experience
- Basic industrial technology skills
- Competent in safe use of common electrical test tools such as VOM, DMM, oscilloscope, etc.
- Completion of quickSTEP course: Basics of AC Drives

Course Profile
2.9 CEUs. This course provides maintenance level training on Siemens SINAMICS S120 and G120 drive systems. Includes an overview of AC Drive power structures, system hardware, basic commissioning steps, and basic steps for configuring and troubleshooting using various methods and test equipment. The use of the Siemens diagnostic and engineering software tool (STARTER) is demonstrated and practiced extensively.

Objectives
Upon completion of this course, the student shall be able to:
- Operate the G120 Drive via IOP Keys
- Perform Basic Commissioning and Set Up via IOP
- Backup and Restore the G120 Operating Program via Memory Card and IOP
- Establish communication with STARTER
- Upload, Archive, and Restore Configuration via STARTER
- Control Drive via STARTER Control Panel
- Use the Diagnostic Fault and Warning Buffer to troubleshoot the system
- Install or Replace a Motor, Power Modules, Control Unit and Cooling Fan

Topics
- Safety, PPE, and ESD
- Perform Hardware Module Diagnostics
- Set up and operate the Drives
- Back-up and restore operating program via OP
- Utilize STARTER software to Upload, Archive and Restore Drive Project
- Troubleshoot a SINAMICS drive system

Automation – SIMATIC S7 with TIA Portal

SIMATIC – Motion Control 1 in the TIA Portal (Classroom or Virtual Instructor-led)

Course code: **SCT-PTTIAMC1A** (classroom)
SCT-PTOILTIAMC1A (virtual)

Target audience
This course is for Programming and/or Commissioning Engineers who are responsible for maintaining systems with Siemens motion-based controls ystems.

Prerequisites
- TIA Portal Programming 1 or TIA Portal Service 2

Course Profile
In this technology course, attendees will program the SIMATIC S7-1500 or S7-1200 controllers in the TIA Portal. They will be able to precisely control the motion of axes with the integrated motion control functions while learning step by step the benefits and use of these functions.

Each learner will be able to select and configure appropriate technology objects, such as speed axis, positioning axis and synchronous axis, as well as, integrate them into the program. In the SCT-PTTIAMC2A course, learners will work with the T-CPU and learn the benefits of functions such as absolute synchronous operation and camming.

Objectives
Upon completion of this course, the student shall be able to:
- Control the motion of axes with the integrated motion control functions.
- Interpret the interaction of the technological functions.
- Commission the SINAMICS servo controller for use in the TIA Portal.
- Select and configure appropriate technology objects, such as: speed axis positioning axis, synchronous axis and integrate them into a program.

Topics
- Basics of motion control
- Speed Axis technology object
- Positioning Axis technology object
- Homing and traversing movements
- Programming with PLC open
- Output cam and measuring input
- Closed-loop control and optimization
- Synchronous Axis technology object

Classroom Virtual

Automation – SIMATIC S7 with TIA Portal

SIMATIC - Motion Control 2 in the TIA Portal

(Classroom or Virtual Instructor-led)

Course code: **SCT-PTTIAMC2A** (classroom)
SCT-PTOILTIAMC2A (virtual)

Target audience
This virtual course is for Programming and/or Commissioning Engineers who are responsible for maintaining systems with Siemens motion-based control systems.

Prerequisites
- SIMATIC – Motion Control 1 in the TIA Portal (SCT-PTTIAMC1A) - Virtual or Classroom

Course Profile
Using the motion control functions of the SIMATIC S7-1500 technology CPU, students will be able to extend applications with absolute synchronous axes or camming. Additionally, students will deepen their knowledge through virtual programming exercises.

During the course, access to fully functional software,virtual tools, and exercises are provided to each participant through a cloud-based application. After completing the course, the learners understand how camming works and can efficiently assign parameters for technology objects.

Objectives
Upon completion of this course, the student shall be able to:
- Use the SIMATIC S7-1500 controller to extend applications with absolute synchronous axes or camming using motion control functions.
- Interpret the interaction of the technological functions
- Select and configure appropriate technology objects, such as: speed axis positioning axis, synchronous axis and integrate them into a program.

Topics
- Overview of S7-1500T Technology CPUl
- Absolute and relative gearing
- Strategies for synchronization and desynchronization
- Cam disc creation using the graphical cam editor
- Kinematic functions configuration and control
- Interplay between Motion Control and Safety Integrated
- Cam disc creation using libraries

Classroom Virtual

Safety

Learning Map

Core Courses: Classroom; Classroom & Virtual; Virtual

Optional / Advanced Courses: Classroom; Classroom & Virtual; Virtual

Reinforcement: How to & support

Siemens offers an entire catalog of Online Self-paced Learning Courses.

Optional Safety and Specialty courses

840Dsl Safety Integrated for OEMs — 4.5 DAYS SCT-SNDSLI1A	**S7-300F Distributed Safety Engineering** — 2.5 DAYS SCT-S7SFTE1A	**TUV SUD Functional Safety Certification** — 3.5 DAYS SCT-TUVFSE1A
840Dsl Safety Integrated Maintenance — 4.5 DAYS SCT-SNSLSM1A	**S7-300F Distributed Safety Sustaining** — 2 DAYS SCT-S7SFTS1A	

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
- Securely reduced speed
- Safe software limit switches
- Safe stopping process

Safety

Safety

TUV SUD Functional Safety Certification

Course code: **SCT-TUVFSE1A**

Target audience
- Application engineers and system integrators with some experience in Functional Safety
- Project and safety managers
- Designers and safety specialists working in machinery applications

Prerequisites
- MS Windows Expertise
- Basics of Functional Safety according to IEC 61508 (SIL) and ISO 13849 (PL)
- Basic exposure to machine safety concepts

Course Profile
The objective of this course is to relate the safety concept of IEC 61508 and cover the main principles for Functional Safety. ISO 13849 and IEC 62061 are covered by demonstrating safety principles according to these standards and how they relate to IEC 61508. Software development of safety related control systems is covered in day three followed by a fourth day question and answer session with resulting final exam.

Objectives
Upon completion of this course, the student shall be able to:
- Analyze the main requirements of IEC 61508 (SIL) and ISO 13849 (PL) for the design of safety related parts.
- Identify risk analysis and selection of protective devices to achieve required risk reduction.
- Review the documentation requirements for machine safety applications typical safety circuits, schematics.
- Identify safety validation requirements.
- Review the software related to safety related control systems.

Topics
- IEC 61508 Safety Concepts
- Safety Principles relating to ISO 13849 & IEC 62061
- Software Development of Safety Related Control Systems
- Final Exam

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

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

SIMOCODE Motor Systems

Learning Map

Core Courses:

Classroom | Classroom & Virtual | Virtual

Foundation and Prerequisite training courses are available for beginners in the form of the **Online Self-paced Learning**. 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.

SIMOCODE

SIMOCODE Pro Motor Management — 2 DAYS

SCT-SCSIMG1A

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 | Product support

Online Product Support
Motor Management and Control Devices SIMOCODE 3UF

Process Analyzers

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

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

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

Online Product Support
Process Analytics

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

(Classroom or Virtual Instructor-led)

Course code: **PIA-PAMAXTSA** (classroom) or **PIA-PAOILMAXTSA** (virtual)

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
- 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.

Classroom Virtual

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 Days | Register here | More information | Product support

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 Days | Register here | More information | Product support

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 | Product support

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

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

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

Process Analyzers

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

Process Analyzers

Introduction to Process Gas Chromatography (Virtual Instructor-led)

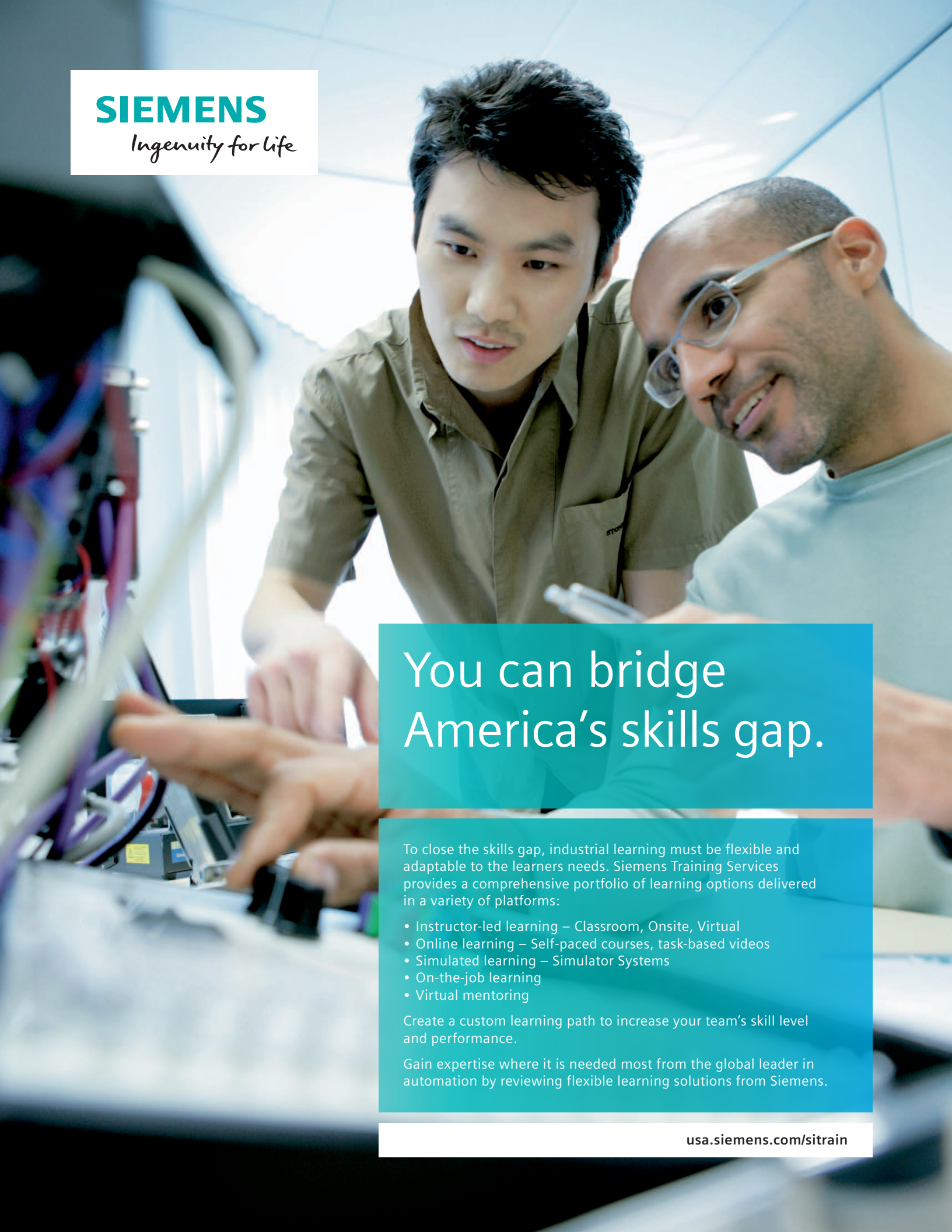
Course code: **PIA-PAOILOPTIA1**

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



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Process Automation – PCS7 / TDC

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

Operators

PCS7 System Operator
Virtual Simulator | 1 DAY | Virtual 6 HOURS
SCT-PCPCSU1x (Classroom)
SCT-PCOILPCSU1x (Virtual)

PCS7 SIMATIC Batch
4.5 DAYS
SCT-PCBATP1x

SIMATIC TDC Engineering with D7 and CFC
4.5 DAYS
SCT-PCTDCP2x

PCS7 Process Safety Sustaining
4.5 DAYS
SCT-PCSFTS1x

Control Engineers System Integrators

SIMATIC PCS7 System Engineering 1
Virtual Simulator | 4.5 DAYS | Virtual 25 HOURS
SCT-PCSYSE1x (Classroom)
SCT-PCOILSYSE1x (Virtual)

SIMATIC PCS7 System Engineering 2
Virtual Simulator | 4.5 DAYS | Virtual 25 HOURS
SCT-PCSYSE2x (Classroom)
SCT-PCOILSYSE2x (Virtual)

Siemens SIMATIC PCS 7 Basic Engineer
2 HOURS
SCT-PCS7CT1x

SIMATIC PCS 7 AS-Engineering
4.5 DAYS
SCT-PCSASE1x

SIMATIC PCS 7 OS-Engineering
4.5 DAYS
SCT-PCSOSE1x

Siemens Certified SIMATIC PCS 7 Engineer
6 HOURS
SCT-PCS7CT2x

Plant Engineers Maintenance

PCS7 System Service 1
4.5 DAYS
SCT-PCSVCS1x

PCS7 System Service 2
4.5 DAYS
SCT-PCSVCS2x

PCS7 SIMIT for Beginners
3 DAYS
SCT-PCSMIT1A

Simulators available for process automation courses

PSC 7 V9 System Engineering — Virtual Simulator

SIMATIC Batch V9 Engineering — Virtual Simulator

VIDEO

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

Online Product Support
Process control systems

Process Automation – PCS7

PCS 7 AS Advanced Engineering

Course code: **SCT-PCSASE1x**

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)

Process Automation – PCS7

PCS7 OS Advanced Engineering

Course code: **SCT-PCOSCP2x**

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

Process Automation – PCS7

Siemens PCS7 Basic Engineer Testing

Course code: **SCT-PCS7T1x**

Target audience
This Siemens PCS7 Basic Engineer Test is intended for PCS7 engineers who have met the prerequisites below.

Prerequisites
- PCS7 Engineering 1
- PCS7 Engineering 2

Course Profile
This is a multiple-choice written performance exam designed to assess the basic skills of a PCS7 Engineer. This is a skills-based certification test covering topics taught during PCS7 Engineering 1 and Engineering 2.

Topics
- PCS7 Documentation and Online Support
- PCS7 system overview
- Station and network configuration - Principles and relationships
- Component View and Plant View
- Basic control functions
- Basics of operating and monitoring
- Locking functions and operating modes
- SCL Basics
- Server-Client System
- Syntax Rules

Process Automation – PCS7 / TDC

Process Automation – PCS7

Siemens PCS7 Certified Engineer Testing

Course code: **SCT-PCS7T2x**

Target audience
This Siemens Programmer Certification Test is intended for experienced PCS7 engineers who have met the prerequisites below.

Prerequisites
- Advanced PCS7 Engineering Experience
- PCS7 Engineering 1
- PCS7 Engineering 2
- PCS7 OS Advanced
- PCS7 AS Advanced

Course Profile
This is a comprehensive performance exam designed to assess the skills of a Certified PCS7 Engineer. The examinee will be required to create and configure a proper PCS 7 Multi-project based on a set of instructions and requirements. This is a practical, skills-based certification test covering topics taught during PCS7 Engineering 1, Engineering 2, OS Advanced and AS Advanced courses.

Topics
- Automation System
- Station and network configuration
- Component View and Plant View
- Server-Client System
- Master Data Library

Process Automation – PCS7

PCS7 Process Safety Sustaining

Course code: **SCT-PCSFTS1x**

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-PCBATP1x**

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 P-Cell, 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-PCSYSE1x** (classroom) or **SCT-PCOILSYSE1x** (virtual)

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

Classroom Virtual

Process Automation – PCS7

PCS7 System Engineering 2

Course code: **SCT-PCSYSE2x** (classroom) or **SCT-PCOILSYSE2x** (virtual)

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

Classroom Virtual

Process Automation – PCS7

PCS7 System Operator

Course code: **SCT-PCPCSU1x** (classroom) or **SCT-PCOILPCSU1C** (virtual)

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)

Classroom Virtual

Process Automation – PCS7 / TDC

Process Automation – PCS7

PCS7 System Service 1

Course code: **SCT-PCSVCS1x**

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 | Product support

Process Automation – PCS7

PCS7 System Service 2

Course code: **SCT-PCSVCS2x**

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 | Product support

Process Automation – TDC

SIMATIC TDC Engineering with D7 and CFC

Course code: **SCT-PCTDCP2x**

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 | Product support

Process Automation - PCS7

SIMIT for Beginners

Course code: **SCT-PCSMIT1A**

Target audience
Decision makers, sales personnel, Project manager, project staff, configuring engineers, programmer.

Prerequisites
- Basic automated controls experience
- Practical experience in SIMATIC PCS 7 project engineering and APL blocks
- Solid computer skills

Course Profile
This course provides a summary of the functions and libraries of the simulation software SIMIT. By practical exercises you will learn about the design of simulations / simulation models for testing. The PCS 7 "Johnsson Project" will be used as the plant model because it provides a complete process automation example for simulation (prior PCS 7 knowledge is not required).

The perfect interplay of all components integrated in SIMIT enables you to produce more in the highest quality duarbly and to establish new products on the market considerably faster.

Objectives
Upon completion of this course, the student shall be able to:
- Create your own components and templates.
- Use the available features for efficient engineering in SIMIT.
- Establish couplings between the simulation in SIMIT and automation systems in PCS 7.
- Emulate the CPU using PLCSIM or the Virtual Controller option of SIMIT.

Topics
- Introduction
- PCS 7 Documentation and Online Support
- The first SIMIT Project
- SIMIT at a glance
- Interfacing with automation via PLCSIM
- Interfacing with automation via Virtual Controller
- Simulation of the device level
- Introduction to process simulation
- User-specific macros and components
- Process simulation with FLOWNET and CHEM-BASIC
- Scripting

Process Instrumentation

Learning Map

Core Courses: Classroom | Classroom & Virtual | Virtual

Optional / Advanced Courses: Classroom | Classroom & Virtual | Virtual

Reinforcement: How to & support

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

Process Instrumentation Level Fundamentals — 2 DAYS — PIA-PRFLTC1A

Process Instrumentation Advanced Level — 2 DAYS — PIA-PRFLTC2A

Process Instrumentation Flow Fundamentals — 1 DAY — PIA-PRFFTC1A

Process Instrumentation Advanced Flow — 2 DAYS — PIA-PRFFTC2A

Process Instrumentation Pressure, Temperature & Valve Positioner Fundamentals — 1 DAY — PIA-PRPTVC1A

Process Instrumentation Advanced Pressure & Temperature — 1 DAY — PIA-PRPRTC2A

Process Instrumentation Advanced Valve Positioners — 2 DAYS — PIA-PRVALC2A

Process Instrumentation Clamp-on Fundamentals — 2 DAYS — PIA-PRFCOC1A

Process Instrumentation Advanced FUS/FUE Clamp-On — 2 DAYS — PIA-PRFCOC2A

Process Instrumentation Advanced FUH Clamp-On — 2 DAYS — PIA-PRFLHC2A

Process Instrumentation Advanced FUG Clamp-On — 2 DAYS — PIA-PRFNGC2A

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

Online Product Support
Process Instrumentation

Process Instrumentation

Level Fundamentals

Course code: **PIA-PRFLTC1A**

Target audience
This introductory course is intended for technical individuals responsible for routine maintenance and calibration of level instrumentation. Additionally sales representatives responsible for selling and specifying these meters will benefit from this class.

Prerequisites
- Basic knowledge of level instrumentation

Course Profile
This course covers basic theory, programming, and installation of the level instrumentation such as the LUT 400, LR 560, CLS 200, and LG 250. It includes a complete review of the hardware components, installation guidelines and commissioning process. The course includes a hands-on exercise with the level instruments to reinforce the training presentation.

Objectives
Upon completion of this course, the student shall be able to:
- Select the appropriate level instrument and sensor for their application.
- Select a suitable installation location
- Fully program their level instrument for the selected application
- Perform system start-up

Topics
- Ultrasonics
- Radar
- Capacitance
- Guided Wave Radar
- Point Level for Liquids
- Point Level for Solids
- Labs

Process Instrumentation

Advanced Level

Course code: **PIA-PRFLTC2A**

Target audience
This advanced course is intended for technical individuals responsible for routine maintenance and calibration of level instrumentation. Additionally sales representatives responsible for selling and specifying these meters will benefit from this class.

Prerequisites
- Basic Level Course (PIA-PRFLTC1A)

Course Profile
This course covers programming, installation, and troubleshooting of level instrumentation such as the LUT 400, LR 560, and LG 250. It includes a complete review of Sonic Intelligence features, installation guidelines, and troubleshooting parameters. The course includes a hands-on exercise with the level instruments to reinforce the training presentation.

Objectives
Upon completion of this course, the student shall be able to:
- Fully program their level instrument for the selected application
- Install level instruments correctly in vessels
- Take Echo Profiles
- Troubleshoot the instrument and application if issues arise

Topics
- Level Theories
- Installation Considerations - Ultrasonics
- Installation Considerations - Radar
- Sonic and Process Intelligence
- Echo Profiles
- Troubleshooting
- Hand Programmer
- Labs

Process Instrumentation

Flow Fundamentals

Course code: **PIA-PRFFTC1A**

Target audience
This introductory course is intended for technicians, engineers and other individuals responsible for installation, commissioning and basic maintenance of flow instrumentation. Additionally sales representatives responsible for selling and specifying these meters will benefit from this class.

Prerequisites
- Basic knowledge of flow fundamentals and process instrumentation.

Course Profile
This course covers basic theory of operation, hardware components, applications, installation considerations and basics of commissioning of flow instrumentation which includes Electromagnetic, Coriolis and Vortex flowmeters.

Objectives
Upon completion of this course, the student shall be able to:
- Understand different pressure measurement types and apply them in a variety of applications.
- Configure a SITRANS P DSIII pressure transmitter via the local pushbuttons and HART (PDM software).
- Troubleshoot pressure and temperature transmitters in the field.
- Recognize and select different temperature sensor types and technologies.

Topics
- Pressure Measurement
- Temperature Measurement

Process Instrumentation

Process Instrumentation

Advanced Flow

Course code: **PIA-PRFFTC2A**

Target audience
This advanced course is intended for technicians, engineers and other plant individuals responsible for installation, routine maintenance, verification and troubleshooting of flow instrumentation. Additionally sales representatives responsible for selling and specifying these meters will benefit from this class.

Prerequisites
- Fundamentals of Flow Technologies (PIA-PRFFTC1A)

Course Profile
Building on the knowledge from the basic flow course, this course teaches participants advanced flow applications including installation, programming and troubleshooting The flow instrumentation to be covered includes Electromagnetic, Coriolis and Vortex flowmeters. The course includes a hands-on exercise to reinforce the training presentation.

Objectives
Upon completion of this course, the student shall be able to:
- Correctly perform installation and setup
- Fully program the flow instruments for various applications
- Perform verification on select Electromagnetic flow meter
- Troubleshoot all instruments and application if issues arise.

Topics
- Electromagnetic Flowmeters
- Coriolis Flowmeters
- Vortex Flowmeters

Process Instrumentation

Pressure, Temperature and Valve Positioner Fundamentals

Course code: **PIA-PRPTVC1A**

Target audience
This introductory course is intended for technical individuals responsible for routine maintenance and calibration of field instrumentation. Additionally, sales representatives responsible for selling and specifying these technologies will benefit from this class.

Prerequisites
- None

Course Profile
This course covers basic theory, applications, and configuration of field instrumentation. Pressure technologies will cover the entire Siemens portfolio, focusing on the SITRANS P DSIII/P410. Temperature technologies covered will include sensor and transmitter options in the SITRANS T family. Valve positioner technologies will focus on the SIPART PS2, also covering general valve, actuator, and positioner types.

Objectives
Upon completion of this course, the student shall be able to:
- Understand different pressure measurement types and apply them correctly
- Configure a SITRANS P DSIII pressure transmitter in the field
- Recognize different temperature sensor types and technologies
- Program a SIPART PS2 for the selected application.

Topics
- Pressure Measurement
- Temperature Measurement
- Valve Positioners

Process Instrumentation

Advanced Pressure and Temperature

Course code: **PIA-PRPRTC2A**

Target audience
This course is intended for technical individuals responsible for routine maintenance and calibration of pressure and temperature instrumentation. Additionally, sales representatives responsible for selling and specifying these technologies will benefit from this class.

Prerequisites
- None

Course Profile
This course covers basic theory, applications, and configuration of field instrumentation. Pressure technologies will cover the entire Siemens portfolio, focusing on the SITARANS P DSIII/P410. Temperature technologies covered will include sensor and transmitter options in the SITRANS T family. This comprehensive class will cover specific applications, as well as accessories required for these applications, such as diaphragm seals, shut-off fittings, and more.

Objectives
Upon completion of this course, the student shall be able to:
- Understand different pressure measurement types and apply them in a variety of applications.
- Configure a SITRANS P DSIII pressure transmitter via the local pushbuttons and HART (PDM software).
- Troubleshoot pressure and temperature transmitters in the field.
- Recognize and select different temperature sensor types and technologies.

Topics
- Temperature Measurement
- Pressure Measurement

Process Instrumentation

Advanced Valve Positioner

Course code: **PIA-PRVALC2A**

Target audience
This comprehensive course is intended for technical individuals responsible for routine maintenance and calibration of valve positioners. Additionally sales representatives responsible for selling and specifying these pneumatic positioners will benefit from this class.

Prerequisites
- None

Course Profile
This course covers programming, installation, and troubleshooting of electro-pneumatic valve positioners. It includes an in depth review of onboard features, installation guidelines, and diagnostic parameters. The course includes a hands-on exercise with complete valve assemblies to reinforce the training presentation.

Objectives
Upon completion of this course, the student shall be able to:
- Program PS2 valve positioner for the selected application
- Troubleshoot common setup issues
- Optimize valve assembly performance
- Know how on extracting stored data inside PS2
- Replace/Install common parts and option modules

Topics
- Introduction to valves and actuators
- Positioner theory and construction
- Applications and mounting
- Initialization and configuration
- Onboard features for optimizing performance
- Diagnostics menu
- Demonstration of PDM and diagnostic data
- Common parts replacement

Process Instrumentation

Clamp-on Fundamentals

Course code: **PIA-PRFCOC1A**

Target audience
This Introductory 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
This course covers basic theory, programming, and installation of the SITRANS FUS/FUP/FUE and FST020 flowmeter types. It includes a complete review of the hardware components and software menu structure, installation guidelines and commissioning process. This course also gives the students an overview of fundamental diagnostics for validation of meter operation. The course includes a hands-on exercise with actual flowmeter systems to reinforce the training presentation.

Objectives
Upon completion of this course, the student shall be able to:
- Select the appropriate flowmeter type and sensors for their application.
- Select a suitable installation location
- Fully program their meter for the selected application
- Perform a sensor installation
- Perform system start-up
- Verify system performance

Topics
- Fundamental Clamp-on Flowmeter Theory
- System Hardware
- Software Menu
- Installation
- Startup
- Verification
- Labs

Process Instrumentation

Advanced FUS/FUE Clamp-On

Course code: **PIA-PRFCOC2A**

Target audience
This Advanced course is intended for technical individuals responsible for diagnosis and corrective action, routine maintenance and calibration of SITRANS FUS/FUE/FST clamp-on flowmeters.

Prerequisites
- SITRANS FUS/FUE 1010 Clamp-On Products (PIA-PRFCOC1A)
- Knowledge of pipes and piping system terminology

Course Profile
This course reviews ultrasonic theory, programming, setup, and operation, of FUS/FUP/FUE and FST020 flowmeter types. To build on this basic knowledge the students will receive in-depth instruction on application review, diagnosis and troubleshooting of operational issues, Utilization of system test modes, and corrective action procedures. They will also learn use of the SiWare software package for data communication, analysis and reporting. The course includes hands-on exercises with actual flowmeter systems to reinforce the training presentations.

Objectives
Upon completion of this course, the student shall be able to:
- Evaluate a potential application and select the appropriate flowmeter type and sensors
- Fully program and install and commission their meter
- Verify system performance
- Troubleshoot, diagnose and correct operational issues
- Utilize system test modes
- Communicate with and collect operational data utilizing SiWare
- Create reports and data graphs

Topics
- Clamp-On Flowmeter Theory
- Review of System Hardware & Software
- Installation & Start-up
- System Verification
- Troubleshooting
- SiWare Intro & Utilization
- Labs

Process Instrumentation

Process Instrumentation

Advanced FUH Clamp-On

Course code: **PIA-PRFLHC2A**

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

Prerequisites
- SITRANS FUS/FUE 1010 Clamp-On Products (PIA-PRFCOC1A)
- Knowledge of Hydrocarbon Industry terminology

Course Profile
This advanced course builds on the information covered in the basic clamp-on flowmeter training class. It covers the specific theory, programming, setup, operation, and verification of the SITRANS FUH flowmeter systems designed for the Hydrocarbon Industry. 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:
- Select the appropriate flowmeter type and sensors for their application.
- Fully program their meter for the selected application
- Select a suitable installation location
- Perform a sensor installation
- Perform system start-up
- Create and modify (optimize) a liquid table
- Verify system performance
- Troubleshoot, diagnose & correct operational issues
- Communicate with and collect operational data utilizing SiWare Software

Topics
- Clamp-On Flowmeter Theory
- System Hardware & Software Menu
- Installation & Start-up
- System Verification
- Troubleshooting
- Communications
- Labs

Process Instrumentation

Advanced FUG Clamp-On

Course code: **PIA-PRFNGC2A**

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
- SITRANS FUS/FUE 1010 Clamp-On Products (PIA-PRFCOC1A)
- Knowledge of Natural Gas Industry Terminology

Course Profile
This advanced course builds on the information covered in the basic clamp-on flowmeter training class. It covers the specific theory, programming, setup, operation, and verification of the SITRANS FUG flowmeter systems designed for the Natural Gas Industry. 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:
- Evaluate and select the appropriate sensors for their application.
- Program meter for selected application
- Create and upload an AGA-8 table
- Select a suitable installation location
- Perform a sensor installation
- Perform system start-up
- Enable local compensation for gas parameters
- Use a flow computer for standard volume compensation
- Verify system performance
- Troubleshoot, diagnose & correct operational issues
- Communicate and collect operational data utilizing Siemens SiWare.

Topics
- Clamp-On Flowmeter Theory
- System Hardware & Software Menu
- Installation & Start-up
- System Verification
- Troubleshooting
- Communications
- Labs

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

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

Industrial Networking

Learning Map

Core Courses: Classroom; Classroom & Virtual; Virtual

Optional / Advanced Courses: Classroom; Classroom & Virtual; Virtual

Reinforcement: How to & support

Networking is the backbone of Digitalization, and as the complexity of our networks increase, so does the demand for experienced and qualified engineers. Siemens Industrial Networks Education Program is a professional certification program offered to individuals who want to proactively position themselves as leaders in their field.

The training to become a Siemens Certified Professional for Industrial Networks (CPIN) is divided into three units each - with a focus in either SCALANCE or RUGGEDCOM. These courses can be taken separately or in succession, in order to build on previous course knowledge. At the end of each course, there is an option to take a test and qualify for the designation of Siemens Certified Professional for Industrial Networks for that specific topic. Once qualified, certifications are valid for three years.

You can find out more about the program at http://usa.siemens.com/yourcertification

Non-Certification Course

Fundamentals of Industrial Networking — 2 DAYS
IEN-NETFUND1A

CPIN Certification Courses

Switching and Routing in Industrial Networks — 5 DAYS; Virtual 5 DAYS
IEN-IKSWROU1A
IEN-IKOILSWROU1A (Virtual)

Wireless LAN in Industrial Networks — 3 DAYS; Virtual 3 DAYS
IEN-IKWLAN1A
IEN-IKOILWLAN1A (Virtual)

Security in Industrial Networks — 3 DAYS; Virtual 3 DAYS
IEN-SECINS1A
IEN-SEOILCINS1A (Virtual)

Switching & Routing in Industrial Networks with RUGGEDCOM — 5 DAYS
IEN-RCMSWROU

Security in Industrial Networks with RUGGEDCOM — 3 DAYS
IEN-RCMSECROX

WiMAX in Industrial Networks with RUGGEDCOM — 3 DAYS
IEN-RCMWIMAX

Online Product Support
Process Instrumentation

Industrial Networking

Fundamentals of Industrial Networking

Course code: **IEN-NETFUND1A**

Target audience
This course is for anyone interested in learning about the fundamentals of networking, either as an introduction or as a refresher. Ideal candidates include, but are not limited to the following:
- Application Engineers
- Automation Engineers
- Commission Engineers
- Communication Engineers
- Control Engineers
- Facility Managers
- Operations or IT Network Engineers
- Plant Engineers
- Project Engineers
- Sales Engineers
- Substation Engineers
- System Engineers

Prerequisites
- None

Course Profile
This course is an introductory course to networking technology and mechanisms – the foundation of today's digital communication. Designed as a recommended prerequisite for our suite of certification courses, it will take you on a tour through the seven networking layers. At the end of the course, students will have a broad understanding of networking terminology, as well as a deeper knowledge of the principles of building Ethernet networks.

Objectives
Upon completion of this course, the student shall be able to:
- The OSI Reference Model
- The Physical Layer (Copper, Fiber, Wireless)
- The Data Link Layer (MAC, VLAN)
- The Network Layer (TCP/IP, Routing Protocols)
- IPv4 vs IPv6 Addressing
- Upper Layer Communications

Topics
- Introduction to Industrial Ethernet
- Layer 1 – Physical Layer
- Layer 2 – Data Link Layer
- Layer 3 – Network Layer
- Layer 4 thorough 7 – Upper Layers

Industrial Networking

Certification for Engineers

Switching and Routing in Industrial Networks

(Classroom or Virtual Instructor-led)

Course code: **IEN-IKSWROU1A** (classroom) or **IEN-IKOILSWROU1A** (virtual)

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

Classroom Virtual

Certification for Engineers

Wireless LAN in Industrial Networks

(Classroom or Virtual Instructor-led)

Course code: **IEN-IKWLAN1A** (classroom) or **IEN-IKOILWLAN1A** (virtual)

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

Classroom Virtual

Certification for Engineers

Security in Industrial Networks

(Classroom or Virtual Instructor-led)

Course code: **IEN-SECINS1A** (classroom) or **IEN-SEOILCINS1A** (virtual)

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

Classroom Virtual

Certification for Engineers

Switching & Routing in Industrial Networks with RUGGEDCOM

Course code: **IEN-RCMSWROU**

Target audience
This course is for users who are involved with developing or sustaining networks in rugged environments. This includes, but is not limited to the following:
- Application Engineers
- Automation Engineers
- Communication Engineers
- Control Engineers
- Facility Managers
- Operations or IT Network Engineers
- Project Engineers
- Substation Engineers
- System Engineers

Prerequisites
Basic knowledge of the "Ethernet". Familiarity with network topologies, Media Access Control (MAC), Internet Protocol, data transport and associated technical vocabulary. Familiarity with the principles of switching operations, hubs and the OSI reference model. Recommended: Industrial Ethernet Fundamentals training course (IEN-NETFUND1A) or pass a written examination.

Course Profile
This course is one of three networking certification courses which incorporate RUGGEDCOM products into the curriculum. At the end of the course, students are equipped with the knowledge to plan, configure, operate and provide support for networks in their specific market.

Objectives
Upon completion of this course, the student shall be able to:
- Security in Industrial Ethernet Networks
- Threats to Industrial Ethernet Networks
- Security Defense-in depth approach
- Security measures and guidelines
- Protecting Control Networks translation
- Site to Site and Remote access via VPN
- Hardening the RUGGEDCOM ROX Security

Topics
- Switching
- Routing

Certification for Engineers

Security in Industrial Networks with RUGGEDCOM

Course code: **IEN-RCMSECROX**

Target audience
This course is for users who are involved with developing or sustaining networks in rugged environments where RUGGEDCOM equipment is required. This includes, but is not limited to the following:
- Application Engineers
- Automation Engineers
- Communication Engineers
- Control Engineers
- Facility Managers
- Operations or IT Network Engineers
- Project Engineers
- Substation Engineers
- System Engineers

Prerequisites
Basic knowledge of the "Ethernet". Familiarity with network topologies, Media Access Control (MAC), Internet Protocol, data transport and associated technical vocabulary. Familiarity with the principles of switching operations, hubs and the OSI reference model. Recommended: Industrial Ethernet Fundamentals training course (IEN-NETFUND1A) or pass a written examination.

Course Profile
This course is one of three networking certification courses which incorporate RUGGEDCOM products into the curriculum. At the end of the course, students are equipped with the knowledge to plan, configure, operate and provide support for networks in their specific market.

Objectives
Upon completion of this course, the student shall be able to:
- Security in Industrial Ethernet Networks
- Threats to Industrial Ethernet Networks
- Security Defense-in depth approach
- Security measures and guidelines
- Protecting Control Networks translation
- Site to Site and Remote access via VPN
- Hardening the RUGGEDCOM ROX Security

Topics
- Protecting Industrial Networks
- Hardening the Switch
- Control Networks Protection
- Concealing Internal IP network Identity
- Building Virtual Private Networks

Certification for Engineers

WiMAX in Industrial Networks with RUGGEDCOM

Course code: **IEN-RCMWIMAX**

Target audience
This course is for users who are involved with developing or sustaining networks in rugged environments – Electric Power, Transportation, Rail, and Defense markets, where RUGGEDCOM equipment is required.

Prerequisites
Basic knowledge of the topic "Ethernet". Familiar with network topologies, Media Access Control (MAC), Internet Protocol, data transport and associated technical vocabulary. Familiar with the principles of switching operations, hubs and the OSI reference model. Recommended: Industrial Ethernet Fundamentals training course or complete the ITIN online training.

Course Profile
One of three networking certification courses which incorporate RUGGEDCOM products, ensuring students learn and test using products they use on a regular basis. The curriculum covers network solutions and how they connect to realtime systems in theory and in practice. Upon completion, students have knowledge to plan, configure, operate and provide support for networks in their specific market.

Objectives
Upon completion of this course, the student shall be able to:
- Wireless concepts
- WiMAX technology details
- RUGGEDCOM WIN product line configuration
- Modulation schemes, noise, interference, fading, multipath, WiMAX PHY/MAC and system provisioning.

Topics
- Wireless Overview
- WiMAX Technology Overview
- End-to-End WiMAX Solution
- RUGGEDCOM WIN Network Entry
- RUGGEDCOM WIN Service Flow & VLANS
- RUGGEDCOM WIN Security
- RUGGEDCOM WIN Monitoring & Troubleshooting

Process Safety Management

Learning Map

Core Courses: Classroom; Classroom & Virtual; Virtual

Optional / Advanced Courses: Classroom; Classroom & Virtual; Virtual

Reinforcement: How to & support

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

PS Asset Integrity Manager — 3 DAYS
OGM-PSAIMG1A

UltraPIPE — 3 DAYS
OGM-ULPIPEG1A

Online Product Support
Process Instrumentation

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 in compliance 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 (PSPPM)

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

PS 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 - (PSAIM™)

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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