



Global
Industry
Partner



SCE Guided Tour – Learning/Training Documents

Siemens Automation Cooperates with Education (SCE) | 02/2026

SCE Learning/Training Documents Offers

More than **100 didactic aligned documents**

- **Designed for use in** classes and lectures;
individual adaptation possible
- Suitable for **self-study**
- For **implementation** of the **SCE Digitalization Concept**
- Available **free-of-charge online** in up to **8 languages**

[↗ Learning/Training Documents](#)



Didactically adapted documents impart practice-based, effective and structured learning content

Getting Started

using SCE Learning/Training Documents

Important Note for Download

Registration in SiePortal required for download

[↗ To Website](#)

Do you already have a SiePortal WebSSO account?

You can download all documents directly from the SiePortal free of charge. If you don't have an account, no problem! The following explanatory video shows you how to quickly create an account.



SCE SiePortal registration guide

For the download of restricted export goods, services, software, application examples, learning/training documents and more, registration is required for all companies, educational institutions, educators, trainers, students and trainees.

A new SCE explanatory video makes the registration process easier for everyone.

If you have any questions about completing the registration form, please contact your local [SCE contact](#).

Watch video:
[↗ DE](#) [↗ EN](#) [↗ ES](#) [↗ FR](#) [↗ IT](#) [↗ ZH](#)
[Register now](#) (in SiePortal see top right)

Explanatory video simplifies the registration process

SCE Learning/Training Documents

According to product technologies



IOT Modules

- Node-RED with
 - SIMATIC IOT2020/2040
 - SIMATIC IOT2050



TIA Portal Modules

- IOT2000EDU / IOT2000
- S7-1500/1200/300
- ET200SP
- WinCC Advanced with TP700 Comfort
- WinCC Basic with KTP700 Basic
- SCALANCE XC208/S615
- Security
- G120
- RFID / RF210R IO-Link
- PID controller
- SCL
- Graph
- SIMIT
- STEP 7
- TIA Portal from V13
- TIA Portal with PLCSIM Advanced, NX MCD



PCS 7 Modules

PCS 7

- V9.0
- V8.1
- V8.0
- V7.0



CNC Modules

CNC

- SinuTrain Operate V4.5
- SinuTrain V6.3



LOGO! Modules

LOGO!

- LOGO! logic modules 0BA0 - 0BA8



Classic Modules

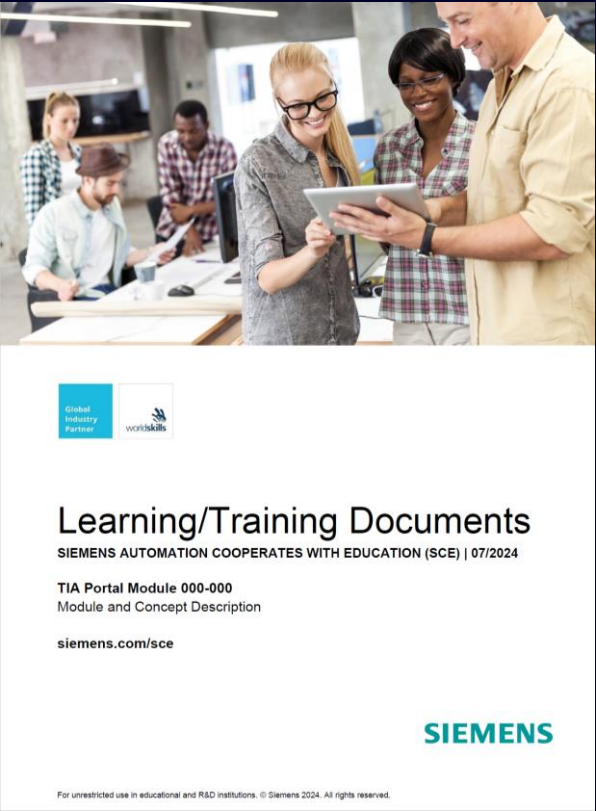
Previous products
up to 2010

[↗ See Guide](#)

SCE Learning/Training Documents

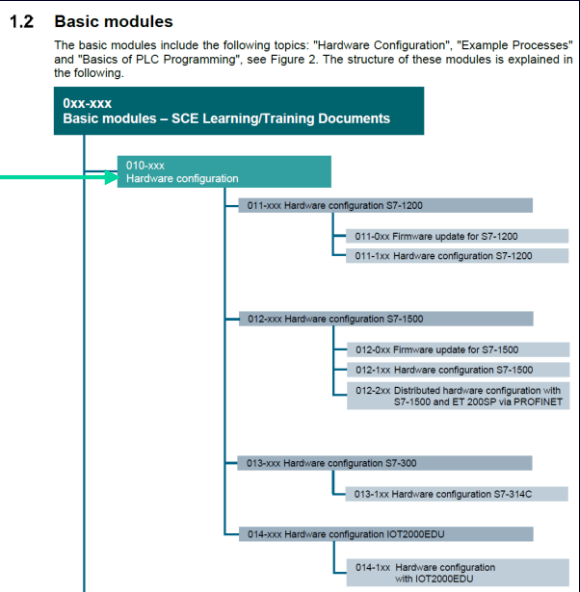
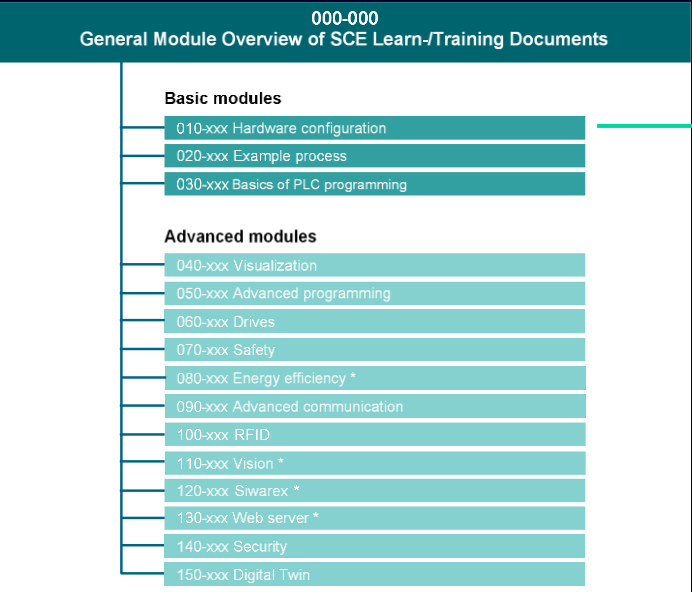
Module and Concept Description

[↗ To document](#)



The module description provides you

- offers you a **complete overview** of the **modules** – **basic and advanced modules** are presented in detail,
- **explains the structure** of the learning/training documents and
- provides you with an **overview of the content** covered in each document.

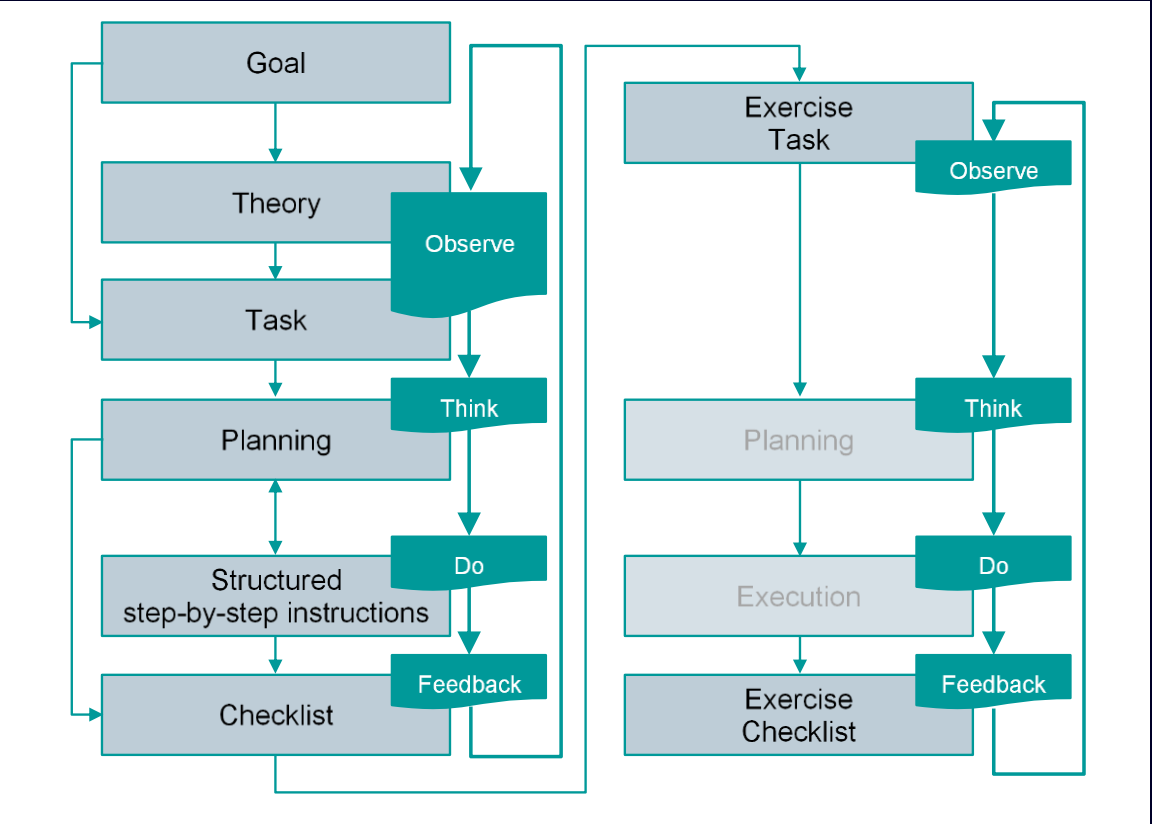


Obtain a quick overview of module offers and structure.

SCE Learning/Training Documents

Didactical structure

[↗ To document](#)



For details, see the SCE Module & Concept Description
Page 12

Didactical structure to consolidate learning success and provide helpful feedback.

SCE Learning/Training Documents

News

Learning/training documents for initial training

Industry 4.0 know-how – proven, curriculum-compliant and customizable: For educators and students of automation and drive technology, we offer over 100 learning/training documents including projects for free download. These cover everything from installation, configuration and programming to commissioning, based on the latest methods of knowledge transfer.



What's new?

The SCE learning/training documents are subdivided into autonomous modules for the various topics, which can be customized according to the reader's knowledge.

Guided Tour

Here for the first time – just start with our guide. You will get a quick overview and recommendations for prepared SCE courses based on our modules.

Quick Links

SCE Quick Links provide you quick access to helpful websites on relevant SCE topics, as well as related links for digital learning modules and learning/teaching materials.

What's new?

Guided Tour

Quick Links

You can always find the latest learning/training documents under News

[News](#)

News – please log in to SiePortal before downloading!

[To SiePortal registration](#) (Login to SiePortal see top right)

If you do not have an account, please create one.

[To the registration guide](#)

Datum	Titel	Sprachen
2024-09	092-300 OPC UA S7-1500 (DE/EN updated, other languages new)	ZIP DE ZIP EN ZIP ES ZIP FR ZIP IT ZIP PT ZIP ZH
2024-09	094-100 Node-RED with SIMATIC IOT2020/2040 (DE/EN updated, other languages new)	ZIP DE ZIP EN ZIP ES ZIP FR ZIP IT ZIP PT ZIP ZH
2024-09	094-101 Node-RED with SIMATIC IOT2050 (DE/EN updated, other languages new)	ZIP DE ZIP EN ZIP ES ZIP FR ZIP IT ZIP PT ZIP ZH
2024-08	094-400 Modbus TCP with LOGO! 8 and Node-RED	ZIP DE ZIP EN
2024-07	000-000 Module and Concept Description	ZIP DE ZIP EN ZIP ES ZIP FR ZIP IT ZIP KR ZIP PT ZIP ZH
2024-03	094-101 Node-RED with SIMATIC IOT2050	ZIP DE ZIP EN
2024-01	092-303 OPC UA with SIMATIC S7-1500 and Node-RED	ZIP DE ZIP EN
2023-12	Digital Learning Modules (Videos)	
	• TIA basic course Factory Automation with SIMIT	DE EN

SCE Learning/Training Documents

Downloads

[↗ Downloads](#)

Downloads



IOT Modules



TIA Portal Modules



PCS 7 Modules



CNC Modules



LOGO! Modules



Classic Modules



Free download in SiePortal WebSSO required! (see Page 4)

Example TIA Portal Modules

Module overview (1)



[➤ TIA Portal Modules](#)

000-150 TIA Portal Modules – Learning/Training Documents for Download

Each learning package for TIA Portal Modules contains: university learning/training documents as well as projects. The learning packages can be used for all teaching situations.

SCE Module Overview

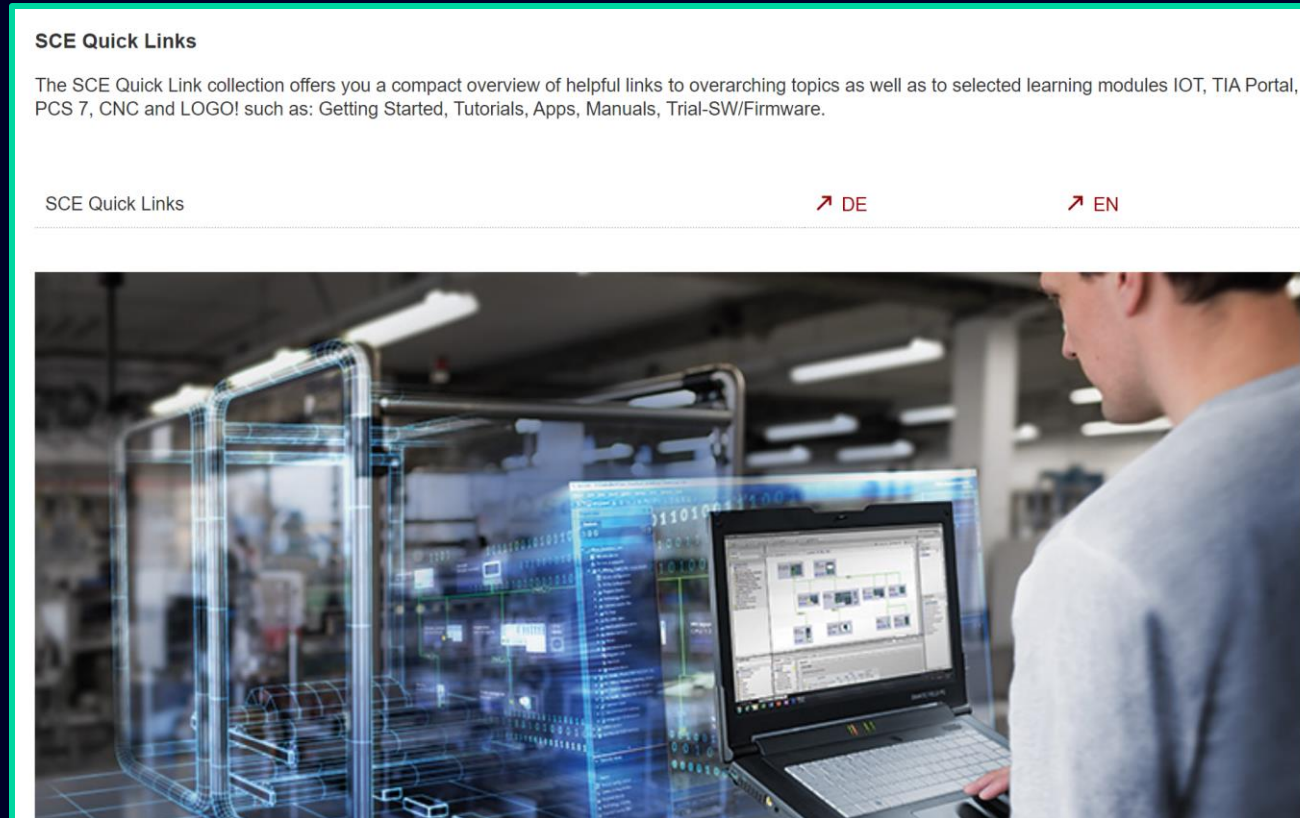
Overview Module and Concept Description	DE	EN
Overview Hardware Configuration	DE	EN
Overview Example Processes with SIMIT Models	DE	EN
Overview Basics of PLC Programming	DE	EN
Overview Visualization	DE	EN
Overview Advanced Programming	DE	EN
Overview Drives	DE	EN
Overview Safety	DE	EN
Overview Advanced Communication	DE	EN
Overview RFID	DE	EN
Overview Security	DE	EN
Overview Additional Modules V12	DE	EN

The module overview provides a quick overview of the content that will be covered in the respective learning/training document

Download area always has an identical structure and downloads are always for free.

Example TIA Portal Modules

Quick Links (2)



[➤ TIA Portal Modules](#)

The quick links offer you a helpful collection of links to numerous SCE relevant and overarching topics.

Download area always has an identical structure and downloads are always for free.
































Example TIA Portal Modules

Downloads (3)



➤ [TIA Portal Modules](#)

Download of the respective learning/training documents incl. projects and documentation in up to 8 languages.

010 Hardware Configuration <u>IOT2000EDU</u>			
014-101 Specific Hardware Configuration with SIMATIC IOT2000EDU (14.7 MB)	ZIP  DE (SHA-256)	ZIP  EN (SHA-256)	
010 Hardware Configuration <u>S7-1500</u>			
0XX-600 Summary Learn-/Training Document S7-1500 (33.7 MB)	ZIP  DE (SHA-256)	ZIP  EN (SHA-256)	ZIP  KR (SHA-256)
012-001 Firmware Update with SIMATIC S7-1500 (7.3 MB)	ZIP  DE (SHA-256)	ZIP  EN (SHA-256)	ZIP  ES (SHA-256)
	ZIP  FR (SHA-256)	ZIP  IT (SHA-256)	ZIP  PT (SHA-256)
	ZIP  ZH (SHA-256)		
012-100 Unspecific Hardware Configuration S7-1500 (20.0 MB)	ZIP  DE (SHA-256)	ZIP  EN (SHA-256)	ZIP  ES (SHA-256)
	ZIP  FR (SHA-256)	ZIP  IT (SHA-256)	ZIP  KR (SHA-256)
	ZIP  PT (SHA-256)	ZIP  ZH (SHA-256)	
012-101 Hardware Configuration S7-1516F (21.0 MB)	ZIP  DE (SHA-256)	ZIP  EN (SHA-256)	ZIP  ES (SHA-256)
	ZIP  FR (SHA-256)	ZIP  IT (SHA-256)	ZIP  KR (SHA-256)
	ZIP  PT (SHA-256)	ZIP  ZH (SHA-256)	
012-105 Hardware Configuration S7-1512C (25.1 MB)	ZIP  DE (SHA-256)	ZIP  EN (SHA-256)	ZIP  ES (SHA-256)

Download area always has an identical structure and downloads are always for free.

SCE Website Learning/Training Documents

Download of further documents

[↗ Further Downloads](#)



Digital Learning Modules (Videos)

Practice-oriented learning modules for TIA
Factory Automation and Digital Twin for
lessons or self-study based on the German
syllabus



Digital Learning Modules

- TIA basic course Factory Automation with SIMIT
- TIA basic course Factory Automation with SIMIT and NX MCD
- Advanced Course Digital Twin

Free download in SiePortal - WebSSO required! (see Page 4)

Digital Learning Modules (Videos)

Basic Course TIA Factory Automation with SIMIT for Download (1)

[↗ To Website](#)

Digital Learning Modules – Learning Packages Basic Course TIA Factory Automation with SIMIT for Download

The learning package contains: Theory document, learning videos, interactive call-to-actions learning videos as well as projects. The learning packages can be used for all teaching situations.

SCE Module Overview

Overview Basic Course TIA Factory Automation with SIMIT

SCE Quick Links

The SCE Quick Link collection offers you a compact overview of helpful links to overarching topics as well as to selected learning modules IOT, TIA Portal, PCS 7, CNC and LOGO! such as: Getting Started, Tutorials, Apps, Manuals, Trial-SW/Firmware.

SCE Quick Links

PDF DE

PDF EN

↗ DE

↗ EN

Basic Course TIA Factory Automation with SIMIT			
Note: The download package contains theory documents in the languages DE, EN, ES, FR, IT, PT and ZH.			
Module 1: Introduction/Warmup Module (020-100) (118.4 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 2: HW-Configuration with CPU1516F (012-101) (187.4 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 3: FC-Programming (032-100) (190.6 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 4: FB-Programming (032-200) (210.4 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 5: IEC Counter/Timer (032-300) (133.2 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 6: Diagnosis with TIA Portal (032-410) (171.3 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 7: Analog Value Processing (032-500) (208.6 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 8: Global Data Blocks (032-600) (208.9 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 9: PID Control (052-300) (144.2 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 10: Sequence Programming GRAPH (052-100) (259.7 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 11: High-Level Language Programming SCL (052-201) (153.7 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 12: WinCC Advanced Basic (042-201) (300.5 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 13: WinCC Unified Basic (042-210) (352.3 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 14: WinCC Unified Alarms and Notifications (042-211) (132.7 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	
Module 15: WinCC Unified Faceplates (042-212) (141.9 MB)	📄 ⚙ DE (SHA-256)	📄 ⚙ EN (SHA-256)	

Teach TIA Factory Automation with SIMIT in a simple way with step-by-step instructions.

Digital Learning Modules (Videos)

Basic Course TIA Factory Automation with SIMIT an NX MCD for Download (2)

[↗ To Website](#)

Digital Learning Modules – Learning Packages Basic Course TIA Factory Automation with SIMIT and NX MCD for Download

The learning package contains: Theory document, learning videos, interactive call-to-actions learning videos as well as projects. The learning packages can be used for all teaching situations.

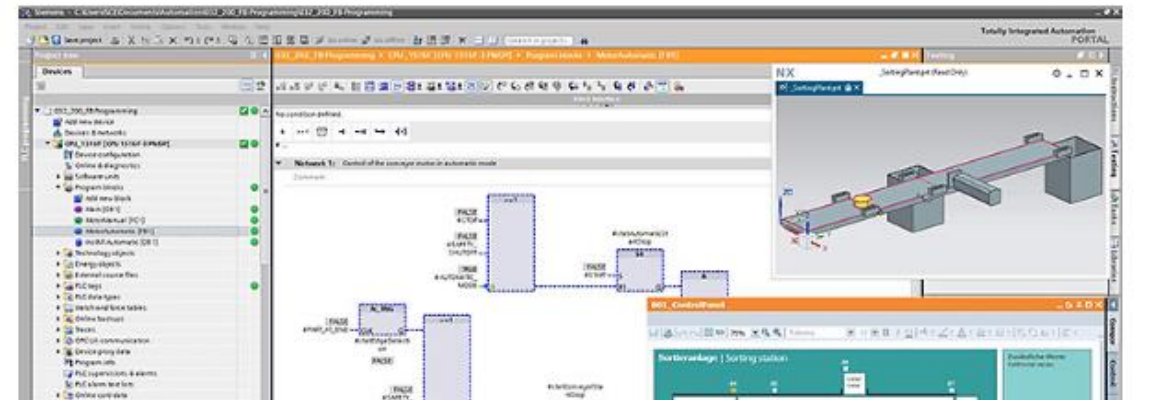
SCE Module Overview

- 📄 Overview Basic Course TIA Factory Automation with SIMIT (EN) (187.0 KB)
- 📄 Übersicht Grundkurs TIA Factory Automation mit SIMIT und NX MCD (DE) (173.7 KB)

SCE Quick Links

The SCE Quick Link collection offers you a compact overview of helpful links to overarching topics as well as to selected learning modules IOT, TIA Portal, PCS 7, CNC and LOGO! such as: Getting Started, Tutorials, Apps, Manuals, Trial-SW/Firmware.

- ↗ SCE Quick Links (EN)
- ↗ SCE Quick Links (DE)



Download Learning Packages – Basic Course TIA Factory Automation with SIMIT and NX MCD

Note: The download package contains theory documents in the languages DE, EN, ES, FR, IT, PT and ZH.

Module 1: Introduction/Warmup Modul (020-100) (144.1 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 2: HW-Configuration with CPU1516F (012-101) (187.4 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 3: FC-Programming (032-100) (209.9 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 4: FB-Programming (032-200) (225.7 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 5: IEC Counter/Timer (032-300) (149.5 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 6: Diagnosis with TIA Portal (032-410) (185.1 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 7: Analog Value Processing (032-500) (228.6 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 8: Global Data Blocks (032-600) (226.7 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 9: PID Control (052-300) (161.1 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 10: Sequence Programming GRAPH (052-100) (283.0 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 11: High-Level Language Programming SCL (052-201) (167.1 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 12: WinCC Advanced Basic (042-201) (316.1 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 13: WinCC Unified Basic (042-210) (368.3 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 14: WinCC Unified Alarms and Notifications (042-211) (103.7 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 15: WinCC Unified Faceplates (042-212) (99.3 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)
Module 16: WinCC Unified Scripts (042-213) (73.7 MB)	📄 DE (SHA-256)	📄 EN (SHA-256)

Teach TIA Factory Automation with SIMIT and NX MCD in a simple way with step-by-step instructions.

Digital Learning Modules (Videos)

Advanced Course DigitalTwin@Education for Download (3)

[↗ To Website](#)

Digital Learning Modules – Learning Packages Advanced Course Digital Twin for Download

The learning package contains learning & training document, learning videos as well as projects. The learning packages can be used for all teaching situations.

SCE Module Overview

Overview Advanced Course Digital Twin

SCE Quick Links

The SCE Quick Link collection offers you a compact overview of helpful links to overarching topics as well as to selected learning modules IOT, TIA Portal, PCS 7, CNC and LOGO! such as: Getting Started, Tutorials, Apps, Manuals, Trial-SW/Firmware.

SCE Quick Links

PDF DE

PDF EN

↗ DE

↗ EN

SIEMENS

SIMATIC HMI

DigitalTwin@Education - Sorting Plant

Actions/Source

Activation

Speed (%)

ConveyorShort

Constant Speed

Variable Speed

ConveyorLong

Constant Speed

Variable Speed

Simulation control

Control signal

Activation

WorkpieceSources

Activated

ResetSimulation

Sensors / Counter

Status

LimitSwitchCylinderNotExtended

LimitSwitchCylinderRetracted

LightSensorWorkpieceDetected

LightSensorCylinderDetected

LightSensorCubeDetected

WorkpieceCounter

CylinderCounter

CubeCounter

TOUCH

Advanced Course Digital Twin

Note: The download package contains theory documents in the languages DE, EN, ES, FR, IT, PT and ZH.

Module 1: Virtual Commissioning (150-001) (101.1 MB)	PDF DE (SHA-256)	PDF EN (SHA-256)
Module 2: Configuration of the Automation Program (150-002) (119.0 MB)	PDF DE (SHA-256)	PDF EN (SHA-256)
Module 3: Enhancements and Optimizations (150-003) (113.8 MB)	PDF DE (SHA-256)	PDF EN (SHA-256)
Module 4: Static 3D Model (150-004) (395.4 MB)	PDF DE (SHA-256)	PDF EN (SHA-256)
Module 5: Dynamic 3D Model (150-005) (284.3 MB)	PDF DE (SHA-256)	PDF EN (SHA-256)
Module 6: Signal Mapping of the Dynamic 3D Model and PLCSIM Advanced (150-006) (186.5 MB)	PDF DE (SHA-256)	PDF EN (SHA-256)

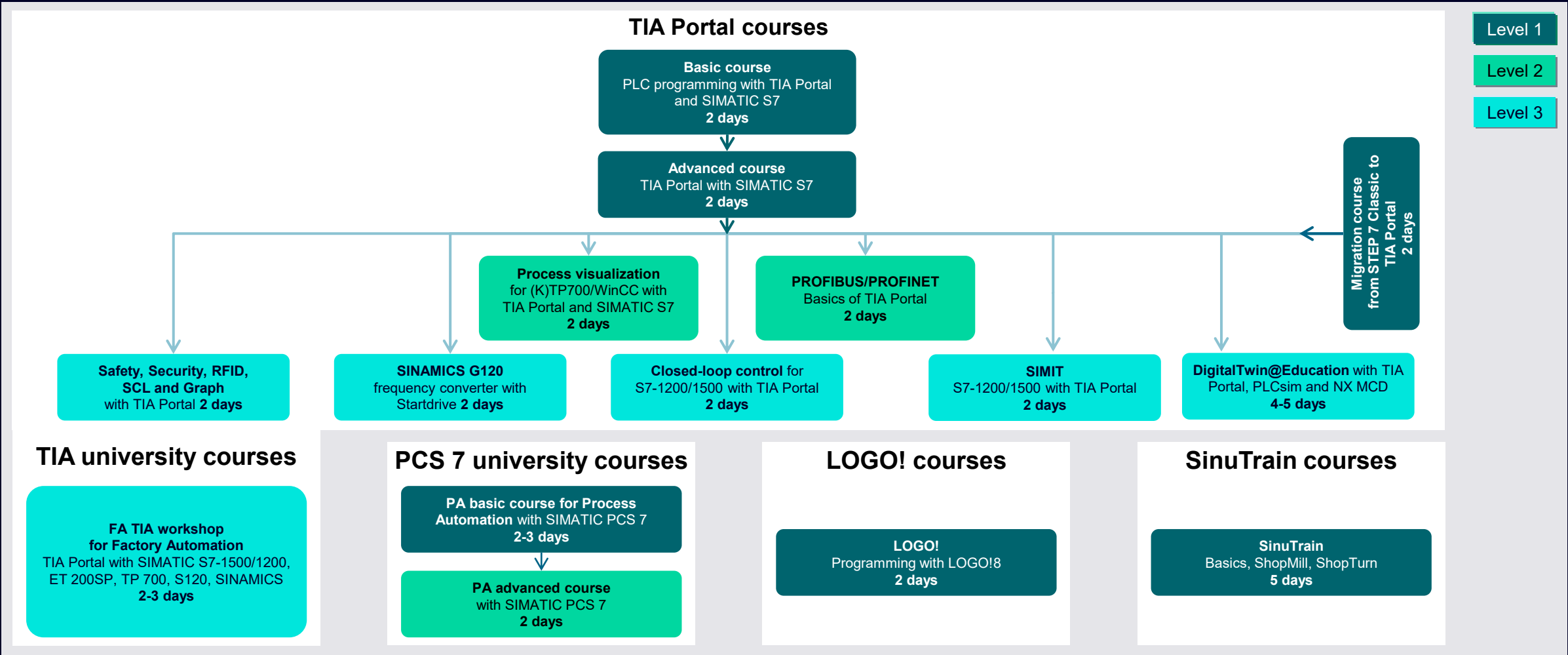
Teach the Digital Twin in your class in a simple way with step-by-step instructions.

Recommendation

Prepared courses


SCE course overview 2026

Educator training courses; Focus: vocational and university education



Detailed overview

Prepared technologies for knowledge transfer

Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
LOGO! course	Basic Course on programming of LOGO!	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of automation technology 	<ul style="list-style-type: none"> LOGO! logic module: 900-010 	<ul style="list-style-type: none"> Information about the use of LOGO! logic modules Getting started with LOGO! Terminal blocks and block numbers of LOGO! Logic operations Block representation in the display of LOGO! The four golden rules for operating LOGO! Overview of the LOGO! menus Example task factory gate control system Program input in LOGO! Parameter assignment to a block Starting and testing the program Debugging in LOGO! Programming and debugging with LOGO! Soft Comfort 	2
TIA Portal course	Basic Course for PLC programming with SIMATIC S7 and TIA Portal  Our recommendation – Start with this basic course	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of automation technology 	<ul style="list-style-type: none"> Hardware configuration S7-1200 modules: 011-100 011-101 011-102 Hardware configuration S7-1500 modules: 012-100 012-101 012-105 Hardware configuration S7-300 module: 013-101 Process description module: 020-100 Programming S7-1200 modules: 031-100 031-200 031-300 031-410 Programming S7-1500 modules: 032-100 032-200 032-300 032-410 	<ul style="list-style-type: none"> Field of application and configuration of SIMATIC S7 device types Operation and function of SIMATIC S7 Creating a project with TIA Portal Configuring an SIMATIC S7 station in TIA Portal Writing, testing and storing program blocks in TIA Portal Addressing and program representation (LAD, FBD) Program structure and program blocks (OB, FB, FC and DB) Basic operation set Symbolic addressing Online test and diagnostic functions Tag declaration in function blocks (FB) and functions (FC) Creating a program example with tag declaration and data block Standard and system functions (IEC timer/ IEC counter) News for programming SIMATIC S7 with TIA Portal 	2

Detailed overview

Prepared technologies for knowledge transfer

Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA Portal course	Advance Training Course for PLC programming with SIMATIC S7 and TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> Hardware configuration S7-1200 module: 011-100 Hardware configuration S7-1500 module: 012-100 Hardware configuration S7-300 module: 013-101 Process description module: 020-100 Programming S7-1200 modules: 031-420 031-500 031-600 Programming S7-1500 modules: 032-420 032-500 032-600 	<ul style="list-style-type: none"> Brief review of the basic course with TIA Portal Data types and data blocks in SIMATIC S7 Program example with data block in TIA Portal Application examples for structured programming with FCs, FBs and DBs Extended instruction set and mathematical functions Reading, outputting and scaling analog values Application example for analog value processing in TIA Portal Test and diagnostic functions in TIA Portal <ul style="list-style-type: none"> Monitoring hardware online Module and operating status Monitoring, controlling and forcing inputs and outputs Exercises for troubleshooting and diagnostics with TIA Portal Error localization and error elimination at SIMATIC S7 <ul style="list-style-type: none"> Hardware diagnostics and diagnostic buffer Additional functions in the target system of the controller Comparing reference data, block assignment and program structure as well as blocks Error organization blocks at SIMATIC S7 Diagnostics and error messages for SIMATIC S7 via the integrated Web server 	2
TIA Portal course	Conversion Course from STEP 7 Classic to the TIA Portal with SIMATIC S7	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of automation technology Basic knowledge of PLC programming with STEP 7 Classic <p><i>Note: This course is intended for users converting from STEP 7 Classic</i></p>	<ul style="list-style-type: none"> Hardware configuration S7-1200 modules: 011-100 011-101 011-102 Hardware configuration S7-1500 modules: 012-100 012-101 012-105 012-110 Hardware configuration S7-300 module: 013-101 Process description modules: 020-100 Programming S7-1200 modules: 031-100 031-200 031-300 031-410 Programming S7-1500 modules: 032-100 032-200 032-300 032-410 	<ul style="list-style-type: none"> Field of application and configuration of the new SIMATIC S7 controllers Creating a project with TIA Portal Configuring an SIMATIC S7 station in TIA Portal Writing, testing and storing program blocks in TIA Portal Addressing and program visualization with LAD and FBD Program structure and program blocks with OB, FB, FC and DB Symbolic addressing Online/test and diagnostics functions Tag declaration in function blocks (FB) and functions (FC) Creating a program example with tag declaration and data block Standard and system functions (IEC timer/ IEC counter) News for programming a SIMATIC S7 with TIA Portal 	2

Detailed overview

Prepared technologies for knowledge transfer

Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA Portal course	Process Visualization with SIMATIC WinCC Basic and SIMATIC S7-1200 in the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Advance Course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> WinCC Basic with KTP700 Basic and SIMATIC S7-1200 module: 041-101 	<ul style="list-style-type: none"> Visualization systems in automation engineering Process control system with SIMATIC WinCC Basic and TIA Portal System description Project structure Creating a process control system with SIMATIC WinCC Basic Starting WinCC Basic and creating projects Specifying the tag management Creating process pictures Controlling process values and representing process values Setting the Runtime properties of the computer/panel and starting Runtime Integrating graphics with SIMATIC WinCC Basic Archiving and displaying measured values with WinCC Basic Alarm logging of SIMATIC WinCC Basic 	2
TIA Portal course	Process Visualization with SIMATIC WinCC Advanced and SIMATIC S7-1500 in the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Advance Course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> WinCC Advanced with TP700 Comfort and SIMATIC S7 module: 042-201 	<ul style="list-style-type: none"> Visualization systems in automation engineering Process control system with SIMATIC WinCC Advanced and TIA Portal System description Project structure Creating a process control system with SIMATIC WinCC Advanced Starting WinCC Advanced and creating projects Specifying the tag management Creating process pictures Controlling process values and representing process values Setting the Runtime properties of the computer/panel and starting Runtime Integrating graphics with SIMATIC WinCC Advanced Archiving and displaying measured values with WinCC Advanced Alarm logging system of SIMATIC WinCC Advanced 	2

Detailed overview

Prepared technologies for knowledge transfer

Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA Portal course	Basics of PROFIBUS and PROFINET with the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> Hardware configuration SIMATIC S7-1500 and ET200SP via PROFINET module: 012-201 	<ul style="list-style-type: none"> Fieldbus systems in automation engineering Requirements for a bus system Hierarchy levels in automation engineering General information about fieldbus systems Technical specifications and functionality of PROFINET/PROFIBUS Bus configuration and network structure Components for configuring PROFINET/PROFIBUS PROFINET/PROFIBUS network components Remote programming via PROFINET/PROFIBUS I/O controllers and field devices on PROFINET/PROFIBUS Commissioning PROFINET with a SIMATIC S7 I/O controller and ET 200 I/O devices Commissioning PROFIBUS with a SIMATIC S7 master and ET 200 slaves Optional: CPU/CPU communication on PROFINET/PROFIBUS 	2
TIA Portal course	Safety Integrated Safety Engineering on PROFINET with SIMATIC S7 in the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC SIMATIC S7 continuation course with the TIA Portal, bus systems with SIMATIC S7 	<ul style="list-style-type: none"> PROFIsafe and PROFINET with ET 200SP and SIMATIC S7-1500 module: 072-100 	<ul style="list-style-type: none"> Basic information for the integration of machine safety Regulations and standards Risk analysis General information on fieldbus systems in use for personal safety Components for configuring a safety-related application on PROFINET Safety Integrated with SIMATIC S7 in the TIA Portal Fail-safe communication with PROFIsafe I/O components for PROFIsafe Safety-related programming with the STEP 7 Safety software in the TIA Portal Commissioning and programming of PROFIsafe with SIMATIC 1500 and ET 200SP Error diagnostics and error analysis for safety engineering application in the TIA Portal Optional: Fail-safe CPU/CPU communication in the TIA Portal with SIMATIC S7 	2

Detailed overview

Prepared technologies for knowledge transfer

Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA Portal course	Application for Industrie 4.0 Industrial Networking IT Security / OPC UA with the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> Advanced Communication modules - OPC UA with SIMATIC S7-1500 and Node-RED: 092-300 092-303 Security module - Industrial Ethernet with SIMATIC S7-1500 and SCALANCE XC208: 142-100 Security module - Industrial Security with SIMATIC S7-1500 and SCALANCE S615: 142-200 	<ul style="list-style-type: none"> Industrie 4.0 - Driving the Digital Enterprise IT security with OPC / Ethernet / PROFINET General information on OPC UA / Ethernet / PROFINET Applications for IT security on Industrial Ethernet Applications for IT security on PROFINET Technical specifications and functionality of OPC UA OPC UA – Open communication in the TIA Portal with SIMATIC S7-1500 Commissioning OPC UA with SIMATIC S7-1500 as a server and Node-RED as client Other OPC UA clients such as TP700, Excel, etc. 	2
TIA Portal course	Application for Industrie 4.0 Industrial Networking PROFINET / IO-Link / RFID with the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> Hardware configuration S7-1500 module: 012-100 RFID Sensor Technology with RF210R IO-Link, ET 200SP and SIMATIC S7-1500 module: 102-101 	<ul style="list-style-type: none"> Industrie 4.0 - Driving the Digital Enterprise Networking with Industrial Ethernet and PROFINET Bus configuration and network structure of PROFINET Commissioning of PROFINET (I/O controller and I/O device) with the TIA Portal Topology, network diagnostics in the TIA Portal Intelligent connection of sensors and switchgear with IO-Link Commissioning of IO-Link on PROFINET with ET 200SP RFID sensor technology Commissioning of RFID sensor RF 210R on IO-Link Integrated diagnostics for PROFINET / IO-Link / RFID 	2

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TIA Portal course	Basic Course: SCL High-Level Language with SIMATIC S7 and TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Advance Course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> SCL and SIMATIC S7-1200 module: 051-201 SCL and SIMATIC S7-1500 module: 052-201 	<ul style="list-style-type: none"> Brief review of the SIMATIC S7 control system Creating a project with the TIA Portal Configuring an S7 station Working with the SCL editor Customizing the SCL user interface Creating user programs in SCL Entering declarations, instructions and comments Description of SCL language The compiling process Selection and assignment of the possible block types Specification of the block interfaces in SCL Continuous monitoring Activating breakpoints Monitoring/forcing tags Reference data 	2
TIA Portal course	Machining Step Programming with GRAPH in the TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> GRAPH and SIMATIC S7 module: 052-100 	<ul style="list-style-type: none"> Possible representations of sequencers; GRAFCET GRAPH programming software as a component of TIA Portal Creating a project with hardware configuration and symbol table in STEP 7 Elements of a sequencer in GRAPH (step / transition / branch / jump / etc.) Creating and compiling a sequencer with GRAPH Downloading a machining step program to PLC and testing it Monitoring the sequencer in GRAPH and other diagnostic functions Sequence control with GRAPH Synchronizing the sequencer with the process Machining step programming with constraints Input/output parameters of the GRAPH function blocks Interlock functions in GRAPH (Interlock) Supervision functions in GRAPH (Supervision) 	2

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TIA Portal course	Basics for Programming an IOT2000	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of automation engineering and the C programming language 	<ul style="list-style-type: none"> Hardware configuration IOT2000 module: 014-101 FC-Programming IOT2000 module: 034-100 OPC-UA and Node-RED with SIMATIC IOT2000 modules: 092-300 / 092-303 / 094-100 	<ul style="list-style-type: none"> Information on areas of application and structure of IOT2000 Introduction to SIMATIC IOT2000 Applications with the IOT2000 (Node-RED, Arduino, OPC client, S7 connection with Node-RED, etc.) Commissioning of IOT2000 including TIA Runtime Addressing the IOT2000 GPIOs Creating a project with the TIA Portal Configuring a SIMATIC S7 station in the TIA Portal Writing, testing and storing program blocks in the TIA Portal 	2
TIA Portal course	Frequency Converter SINAMICS G120 on PROFINET with SIMATIC S7 and TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Advance Course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> Frequency Converter G120 on PROFINET with SIMATIC S7-1500 module: 062-101 	<ul style="list-style-type: none"> Presentation of the SINAMICS frequency converters from SIEMENS Drive configuration with the SIZER software Commissioning and parameter assignment of these converters with SINAMICS Startdrive Structure of the parameter assignment with authorization levels Parameter assignment of SINAMICS G120 Commissioning with asynchronous motor Troubleshooting Connection of a frequency converter to a SIMATIC S7 PLC via PROFINET Communication structure of PROFINET Commissioning a SIMATIC S7 PLC as an IO controller Setting up the frequency converter as an IO device on PROFINET Remote control of the frequency converter via PROFINET Remote parameter assignment of the frequency converter via PROFINET Remote diagnostics for the frequency converter via PROFINET Parameter assignment with the SINAMICS Startdrive software in the TIA Portal Optional: Motion Control technology objects for S7-1500 	2

Detailed overview

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Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA Portal course	Control technology SIMATIC S7 with TIA Portal	<ul style="list-style-type: none"> Basic knowledge of Windows PC Advance Course SIMATIC S7 with TIA Portal 	<ul style="list-style-type: none"> Programming S7-1200 module: 031-500 Programming S7-1500 module: 032-500 Extended programming S7-1200 module: 051-300 Extended programming S7-1500 module: 052-300 	<ul style="list-style-type: none"> Controllers in automated plants Software controller for SIMATIC S7 in TIA Portal Design steps and modeling in controlling of process variables Quality requirements for the control loop Controller structures Controller parameters and adjustment procedure Controller testing Data types at SIMATIC S7 Mathematical functions and data type conversion Reading, outputting and scaling analog values Developing a program for two-step controllers in TIA Portal Testing the program for two-step controllers and commissioning with processes Controller block as software PID controller Configuring an SIMATIC S7 station in TIA Portal Integrating and configuring the PID controller software in STEP 7 programs with TIA Portal Setting and configuring the PID controller software in TIA Portal Commissioning the PID controller software with processes 	2
TIA Portal course	Project Work and Commissioning of Industrie 4.0 System with Application Examples for Different IEC 61131 Programming Languages	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of control engineering/STEP 7 		<ul style="list-style-type: none"> To be individually coordinated with the system of the customer or the systems used elsewhere 	2

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Prepared technologies for knowledge transfer

Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA Portal course	SIMIT SCE – Simulating Plants Dynamically on the PC	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic course SIMATIC S7 	<ul style="list-style-type: none"> Process description sorting station module: 020-100 SIMIT process simulation – coupling modules: 020-110 / 020-111 / 020-112 SIMIT process simulation – basics module: 020-120 	<ul style="list-style-type: none"> General information about SIMIT Installing the SIMIT software Managing and setting up projects General procedure for creating a project Setting up a new project Configuration of the interface to PLCSim / PLCSim Advanced / OPC UA Configuring an operating screen General information about animation of screens Component types and components Assigning component parameters Creating example projects Starting the simulator and testing the programs Connection to real PLC 	2
TIA Portal course	DigitalTwin@Education	<ul style="list-style-type: none"> Basic and advanced knowledge of TIA Portal/PLCSIM Advanced und NX MCD 	<ul style="list-style-type: none"> Modul 1: 150-001 Virtual commissioning of a production plant using a dynamic 3D model Modul 2: 150-002 Configuration of the Automation Program of a Dynamic 3D Model in the TIA Portal Modul 3: 150-003 Enhancements and Optimizations of an Automation Program for a 3D Model Modul 4: 150-004 Creating a Static 3D Model Using the NX CAD System Modul 5: 150-005 Creation of a Dynamic 3D Model Using the Mechatronics Concept Designer CAE System Modul 6: 150-006 Signal Creation for a Dynamic 3D Model in the Mechatronics Concept Designer CAE System 	<ul style="list-style-type: none"> Module 1: Virtual commissioning of a provided virtual 3D sorting plant model with the TIA Portal, PLCSIM Advanced and NX MCD (Mechatronics Concept Designer) Module 2: Explanation of the specified automation program in TIA Portal for the control of the existing 3D sorting plant model Module 3: Presentation of possible modifications and optimizations of the automation program in TIA Portal for the provided virtual 3D sorting plant model Module 4: Modeling and creation of your own static 3D model for the sorting plan using the NX CAD system Module 5: Dynamization of the created 3D sorting plant model using the NX MCD CAE system Module 6 – in Preparation: Creation and mapping of the relevant signals for the automation program for the created 3D sorting plant model in NX MCD. In addition, validation of the desired functionality of the digital twin in interaction with the virtual controller in PLCSIM Advanced. <p>They are prepared for use with SIMATIC STEP 7 Professional V15 or higher, SIMATIC WinCC Advanced V15 or higher, PLCSIM Advanced V2.0 or higher and NX MCD V12.0 or higher.</p>	5

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Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
TIA university courses	University Workshop: TIA Portal with SIMATIC S7-1500, ET 200SP on PROFINET and Visualization with WinCC Advanced	<ul style="list-style-type: none"> Basic knowledge of automation engineering with SIMATIC 	<ul style="list-style-type: none"> Hardware configuration S7-1500 module: 012-100 Hardware configuration S7-1500 module and ET 200SP: 012-201 Process description module: 020-100 Programming S7-1500 modules: 032-200 032-300 032-410 032-420 Visualization module: 042-201 Frequency Converter G120 on PROFINET with SIMATIC S7-1500 module: 062-101 	<ul style="list-style-type: none"> TIA Portal: New information about SIMATIC S7-1200/1500 PLCs Safety and security with SIMATIC S7-1200/1500 More efficient programming and configuration with the TIA Portal and SIMATIC S7-1500 New commands and functions of SIMATIC S7-1200/1500 Programming examples for SIMATIC S7-1500 Test and diagnostic functions for SIMATIC S7-1500 Remote programming and web services for SIMATIC S7-1500 Commissioning of PROFINET with the TIA Portal: SIMATIC S7-1500 as IO controller and ET 200SP as IO device Process visualization in the TIA Portal with WinCC Example application for WinCC with the TIA Portal and Comfort Panel TP700 Commissioning and parameter assignment of these converters with SINAMICS Startdrive Connection of a frequency converter to a SIMATIC S7 PLC via PROFINET 	2
PCS 7 University course	PA Basic Course for Process Automation with SIMATIC PCS 7 Process Control System	<ul style="list-style-type: none"> Basic knowledge of SIMATIC S7 Process visualization basic knowledge 	<ul style="list-style-type: none"> PA university curriculums for SIMATIC PCS 7 modules: P01-00 to P01-08 	<ul style="list-style-type: none"> Introduction to process control system SIMATIC Process Control System PCS 7 Process description and system structure SIMATIC Manager and hardware configuration Plant hierarchy in SIMATIC PCS 7 Continuous Function Chart (CFC) <ul style="list-style-type: none"> Individual control functions with CFC Plant safety with CFC Control technology with CFC Programming sequential control systems with Sequential Function Chart (SFC) SIMATIC PCS 7 graphic generation for the operator station 	2

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Course type	Course	Prerequisites	SCE Learn-/Training Documents	Contents	Days
PCS 7 University course	PA Advance Course for Process Automation with SIMATIC PCS 7 Process Control System	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of process control technology with SIMATIC PCS 7 basic knowledge of Windows PC 	<ul style="list-style-type: none"> PA university curriculums for SIMATIC PCS 7 modules: P01-01 P02-01 to P02-03 P03-01 P03-02 	<ul style="list-style-type: none"> Commissioning PCS 7 project from basic course Repetition and details of programming with CFC and SFC in PCS 7 Alarm Engineering and alarm system in PCS 7 Bulk processing and reusability of structures in PCS 7 Archiving Trend reporting and trend display in PCS 7 Advanced operator control design with ActiveX controls and user-defined objects Vertical integration with OPC 	2
SinuTrain course	Basics of CNC technology with SinuTrain	<ul style="list-style-type: none"> Basic knowledge of Windows PC Basic knowledge of NC technology 	<ul style="list-style-type: none"> CNC technology modules: 700-010 700-020 700-030 	<ul style="list-style-type: none"> Basic concept and configuration versions of SinuTrain as training software for SINUMERIK controllers Handling of control components of SinuTrain Manual functions and screen layout Setup and measuring of tools Work offsets Practical commissioning of the machine tool Part program management and program editor Creating a simple workpiece according to DIN 66025 Programming DIN standard cycles with SinuTrain Simulation functions in SinuTrain Machining of the workpiece with the machine tool Special characteristics of SHOPMILL and SHOPTURN Work step programming Program creation with the contour calculator CAD reader Data backup and data transmission Programming milling parts with SHOPMILL Programming lathed parts with SHOPTURN 	2

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