F.A.C.T

**Festo
Authorized
and Certified
Training Centre**

**Training
Plan**

Festo - the Automation Company

/Festo Industry

Festo offers components, modules and solutions for all levels of Automation Technology in the Industry. Festo is providing pneumatic, electric and electronics components for all levels and applications in Factory and Process Automation.

The German Company Festo is one of the world leaders in Industrial Automation with more than 15.800 employees worldwide and represented by 58 branches and partners in 170 countries. More than 75 years of experience are waiting to assist you!

/Festo Didactic

From basic training to the planning, control and handling of complex networked CIM-systems, Festo Didactic is the leading supplier of learning and training solutions for all educational and continuous training institutions. Our solutions are developed to meet your specific requirements for fast and effective learning and guaranteed training success. Festo Didactic is providing complete solutions from state-of-the-art training equipment, software, brainware, training programs up to complete turn-key training labs according to international standard.

Training for the Industry

\Productivity

The relentless competitive pressure in industry demands that all stakeholders in skills – in particular manufacturing companies and the training organisations that serve them – optimise their productivity in order to survive in the competitive and globalized world. Our training will improve the performance of your technology and your people which will finally directly result in the increase of your Productivity.

\Professional Competence

Our training program focus on the Professional Competence, by means of knowledge, skills and professional attitude. Our training equipment is set-up with purely industrial components and enables the participants to work hands-on with a real manufacturing process either in Factory or in Process Automation.

Always one step ahead by partnering with Festo !
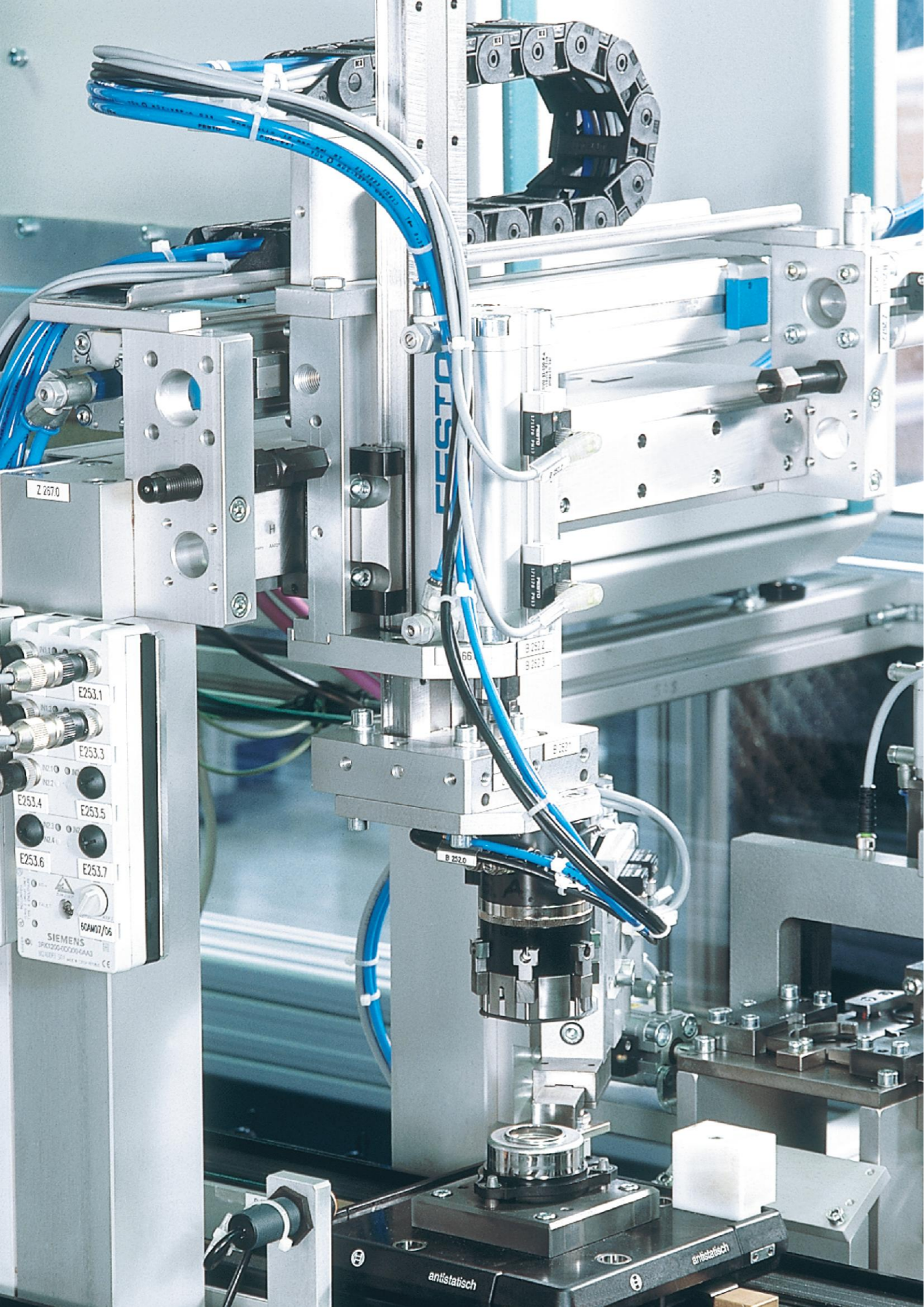
Benefits of industrial Training

The advantages for you to send your employees and staff to our short-term training program are obvious:

- short-term training program in each 3-days modules
- immediate access to high-tech and state-of-the-art technologies and equipment
- increase the independency of suppliers
- increase Productivity because the training is based on Professional Competence
- increase the self-confidence of the employees and staff
- effectively handling of new manufacturing and control systems
- the training program is authorized and certified by Festo - a global player in Automation Technology

Training program

Please refer to our short-term training program overview. All of our modules are designed as a 3-days short-term training program for your convenience.

In the Fully Automation lab we divided the training in FA = Factory Automation and PA = Process Automation

On request, we can also offer some of our training modules in-house, by means of we will come to you to conduct the training there !

We can also design a specific training program for you - please ask us !

Title	Order No.	Code	Length	Page
Introduction to Control Technology	FACT-INT101-1012	INT101	3 days	13
Pneumatics	FACT-PNB111-1012	PNB111	3 days	14
Electro-Pneumatics Basic	FACT-EPB121-1012	EPB121	3 days	15
Electro-Pneumatics Advanced and Safety	FACT-EPA122-1012	EPA122	3 days	16
PLC Programming Basic	FACT-PLC131-1012	PLC131	3 days	17
FA - Introduction to Automation and Mechatronics	FACT-INT201-1012	INT201	3 days	19
FA - Commissioning and Trouble Shooting	FACT-ICT211-1012	ICT211	3 days	20
FA - PLC Programming Advanced	FACT-PLC232-1012	PLC232	3 days	21
PA - PLC Programming Higher Functions	FACT-PLC233-1012	PLC233	3 days	22
PA - Closed Loop Control in Process Automation	FACT-CLC241-1012	CLC241	3 days	23

FACT Centre Laboratories

\Basic Technologies

Training in the basic disciplines of Mechatronics is the very first step of education and training in Factory and Process Automation. To be able to think and act within a networked system, the basic technologies must be fully understood. As an important technology in the Industry, all aspects of Fluidics can be trained in this lab.

\Fully Automation

Our lab of Fully Automation is divided into the 2 sections of industrial manufacturing.

Factory Automation is the handling of solid workpieces throughout the entire manufacturing process, by means of in each step of the process the shape, dimension, orientation and material is known.

Process Automation is the control of all flowing materials, such as fluids, gas or powdery material, manual or automated processes i.e. the production, transportation, treatment and disposal.

Introduction to Automation and Mechatronics

Code: INT 101

Short description: This training module is focussing on the technical overview of different control
                           technologies - from Pneumatics to hard-wired Electro-Pneumatics up to the
                           free programmable logic contoller called PLC.

Contents: - Theory of Pneumatics - air-pressure supply and components
                           - Handling of the planning and simulation software FluidSim
                           - Plan, edit and test circuits on FluidSim and the real training equipment
                           - Theory of Electrics and Electro-Pneumatics
                           - Plan, edit and test circuits on FluidSim and the real training equipment
                           - Theory of Programmable Logic Controllers - PLC
                           - Hardware addresses - absolute and symbolic addressing
                           - Structural programming
                           - Plan, edit and test of projects using the PLC and real training equipment

Competencies: The participant ....
                           - understands the theory of Pneumatics, air-supply and components
                           - is able to plan, design and test Pneumatic circuits
                           - understands the theory of Electrics and Electro-Pneumatics
                           - is able to plan, design and test Electro-Pneumatic circuits
                           - understands the importance of PLC in the Industry
                           - knows the differences between the different control technologies
                           - knows the absolut hardware addresses and symbolic addressing of a PLC
                           - knows the meaning of structural programming and the different languages
                           - is able to plan, edit and test a project using a PLC

Prerequisites: No prerequisites required

Duration: 3 days

Order Number: FACT-INT101_1012

Pneumatics

Code: PNB 111

Short description: Pneumatics is one of the most important technology used in the Industry. This workshop will provide the necessary know-how based on hands-on training on real industrial equipment.

Contents:
- Introduction Basic Technologies of Mechatronics
- Theory in Pneumatics - fundamentals, applications, air pressure-supply
- Function of the components
- Handling of FluidSim Pneumatics
- Direct and indirect control of pneumatic cylinders
- Memory control
- Basic digital functions - AND, OR, NOT, RS-FF
- Pressure and time control
- Interlacing circuit

Competencies: The participant ....
- understands the importance of Pneumatics in the Industry
- understands the physical fundamentals of Pneumatics
- understands all important aspects of air-pressure supply
- knows the construction and function of components
- is able to handle the planning, design and simulation software FluidSim
- is able to plan, design, set-up and test of Pneumatic circuits
- understands the speed control of Pneumatic actuators
- understands the function of end-position sensors
- understands the pressure- and time control of Pneumatic actuators

Prerequisites: No prerequisites required

Duration: 3 days

Order Number: FACT-PNB111-1012

Electro-Pneumatics Basic

Code: EPB 121

Short description: Electro-Pneumatics is the perfect tool to be prepared for the next step of PLC controlled manufacturing process. This workshop will work-out all basic aspects of electrical control in Pneumatics.

Contents:
- Introduction Basic Technologies of Mechatronics
- Theory in Pneumatics and Electrics - fundamentals, applications, supply
- Function of the components
- Handling of FluidSim Pneumatics
- Direct and indirect control in Electro-Pneumatics
- Interlacing circuit
- Memory control
- Basic digital functions - AND, OR, NOT, RS-FF
- Function of end-position sensors

Competencies: The participant ....
- understands the importance of Pneumatics in the Industry
- understands the physical fundamentals of Pneumatics and Electrics
- understands all important aspects of air-pressure supply
- knows the construction and function of components
- is able to handle the planning, design and simulation software FluidSim
- is able to plan, design, set-up and test of Electro-Pneumatic circuits
- understands the speed control of Pneumatic actuators
- understands the function of end-position sensors
- understands the function of electronic proximity switches

Prerequisites: No prerequisites required

Duration: 3 days

Order Number: FACT-EPB121-1012

Electro-Pneumatics Advanced and Safety

Code: EPA 122

Short description: This workshop will work-out all advanced aspects of electrical control in
                             Pneumatics. Further to that, we will work on sensors as well as the impor-
                             tant aspects of safety within industrial applications.

Contents: - Summarization of Electro-Pneumatics basics
                             - Planning, design, set-up and test of circuits with 2 cylinders
                             - Planning, design, set-up and test of time control
                             - Planning, design, set-up and test of pressure control
                             - Sensors in Factory Automation - description and functions
                             - Projects using different sensors
                             - General safety aspects in the Industry
                             - Safety circuits in Electro-Pneumatics

Competencies: The participants ...
                             - can identify and explain symbols of Electro-Pneumatic components
                             - can identify and describe the construction features of components
                             - can interpret technical specifications of Electro-Pneumatic components
                             - is able to plan, design, set-up and test circuits using 2 cylinders
                             - is able to plan, design, set-up and test time control circuits
                             - is able to plan, design, set-up and test pressure control circuits
                             - understands the function of sensors used in Factroy Automation
                             - is able to plan, design and test circuits using different sensors
                             - understands the general aspects of safety in industrial applications
                             - is able to plan, design and test safety circuits

Prerequisites: Complete EPB 121 or basic know-how in Electro-Pneumatics

Duration: 3 days

Order Number: FACT-EPA122-1012

Factory Automation - PLC programming Basics

Code: PLC 131

Short description: This training program is focussing on the structure and mode of operation
                             of PLC as well as how to create basic logic association programs. A key
                             element of the workshop is application and handling, using the program-
                             ming terminology and taking into account the various interfaces between
                             the individual technologies (mechanical, pneumatics, electrical and PLC).

Contents: - Overview of controllers used in the Industry
                             - PLC fundamentals in general
                             - Functions of the components used in Electro-Pneumatics
                             - Handling of the PLC programming software
                             - Definition of the in- and output addresses
                             - Absolute and symbolic addressing
                             - Structural programming and uncondition and condition call
                             - Planning, edit and test projects in digital technology

Competencies: The participant ...
                             - knows the different controllers used in the Industry
                             - understands the function of all Electro-Pneumatic componentes
                             - understands the function of a PLC
                             - is able to define the in- and outputs
                             - understands the absolute and symbolic addressing of in- and outputs
                             - has an overview about the PLC programming languages - LAD, STL, FBD
                             - knows all basic digital modules - AND, OR, NOT, RS-FF ...
                             - is able to plan, edit and test PLC projects in Ladder Diagram

Prerequisites: No prerequisites required

Duration: 3 days

Order Number: FACT-PLC131-1012

Introduction to Automation and Mechatronics

Code:	INT 201

Short description: This training module introduces the 4 important tasks which are required in the Industry - Installation&Commissioning, Programming, Communication and Maintenance&Trouble Shooting.

Contents:
- Planning to set-up a Flexibel Manufacturing System - FMS
- Installation and Commissioning of the FMS
- Test the entire material- and signal flow through the FMS
- Function of a PLC in general and of the ML 1500 in particular
- Structure of a PLC program
- Project solutions for the single FMS stations in Ladder Diagram
- Theory about Industrial Communication in general and I/O in particular
- Theory about the 3-phases of Trouble Shooting
- Trouble Shooting within the entire FMS process

Competencies: The participant ...
- the four tasks required by the Industry
- is able to plan a project according to a workpiece description
- is able to set-up a networked system
- is able to adjust mechanical, electrical and pneumatic components
- understands the basic principals of a PLC
- is able to plan, edit and test project solutions with PLC´s
- understands the 3 levels of industrial communication
- understands the difference between Maintenance and Trouble Shooting
- is able to detect errors, limitate errors and eliminate errors professionally

Prerequisites: No prerequisites required

Duration: 3 days

Order Number: FACT-INT201_1012

Commissioning and Trouble Shooting

Code: ICT 211

Short description: A very essential part of the professional competence in the Industry is not
                     only to be able to plan and set-up automated Flexible Manufacturing Sys-
                     tems - FMS but also to fully maintain them and professionally conduct
                     Trouble Shooting.

Contents: - Functions of the single MPS stations of the FMS
                     - Functions of the components used within the FMS
                     - Plan and set-up a FMS according to a specification
                     - Mechanical, pneumatical and electrical adjustment of the FMS
                     - Run and observe an example process of the FMS
                     - Theory of Trouble Shooting
                     - Three-phase model of professional Trouble Shooting
                     - Trouble Shooting within the FMS

Competencies: The participant ...
                     - is able to understand and describe the functions of a FMS
                     - is able to plan and set-up a FMS
                     - is able to conduct the full commissioning of a FMS
                     - is able to download user programs and test-run the process
                     - understands the theory and measurement methods in Trouble Shooting
                     - knows the differences between commissioning/maintenance errors
                     - can perform systematic Trouble Shooting within a FMS
                     - can perform systematic Trouble Shooting within a PLC program

Prerequisites: No prerequisites required

Duration: 3 days

Order Number: FACT-ICT211-1012

PLC programming Advanced

Code: PLC 232

Short description: This training module is based on the know-how of the basic PLC program-
                     ming module by transferring that know-how to the single stations of a
                     Flexible Manufacturing System. The participants will plan, edit and test PLC
                     project solutions for the single stations of the Factory Automation system
                     called MPS 200.

Contents: - Functions of the single FMS stations
                     - Components - specification and function
                     - Definition of the input and output addresses of the FMS stations
                     - Absolute and symbolic addressing
                     - Plan, edit and test PLC projects for each single FMS station
                     - Planning of the I/O-communication between the single stations
                     - Plan, edit and test the I/O-communication
                     - Plan, edit and test the material- and signal flow through the entire FMS

Competencies: The participant ...
                     - knows the functions and symbols of different sensors and actuators
                     - is able to distribute an entire project into logical steps
                     - is able to plan a step-by-step programming solution with a PLC
                     - is able to test a programming solution according to a specification
                     - understands the levels of industrial communication
                     - is able to plan an I/O-communication within a FMS
                     - understands the Stop and Emergency Stop conditions within a FMS
                     - is able to test an entire project solution according to a specification

Prerequisites: Completion of PLC 131or basic know-how in PLC programming

Duration: 3 days

Order Number: FACT-PLC232-1012

PLC programming Higher Functions

Code: PLC 233

Short description: As a preparation of controlling analogue signals and closed loop Process
                      Automation equipment, we have to work-out the know-how in Word pro-
                      cessing, arithmetic functions of a PLC and analogue in- and output control
                      first. This workshop is providing that know-how using our high ophisti-
                      cated Process Automation Workstations.

Contents: - Functions of the MPS PA Workstations
                      - Components - specification and function
                      - Definition of the input and output addresses
                      - Absolute and symbolic addressing
                      - Theory of analogue inputs and normalization
                      - Arithmetic functions of the PLC - theory and exercises
                      - Project using analogue inputs and normalization to the process variable
                      - Project using analogue outputs and normalization to the process variable
                      - Plan, edit and test of a 2-step controller

Competencies: The participant ...
                      - understands the difference between binary, analogue and digital signal
                      - knows the function of components used in Process Automation
                      - understands the difference between absolute and symbolic addressing
                      - knows the theory of analogue in- and outputs of a PLC
                      - is able to plan, edit and test projects using analogue signals
                      - is able to plan, edit and test normalization of analogue signals
                      - is able to plan, edit and test a 2-step controller

Prerequisites: Completion of PLC 131 and/or PLC 232

Duration: 3 days

Order Number: FACT-PLC233-1012

Closed Loop Control in Process Automation

Code: CLC 241

Short description: More and more closed loop process in the Process Automation Industry
                      are controlled by PLC´s not by Industrial Controllers anymore. Using a PLC
                      has several advantages which this workshop is focusing on.

Contents: - Preparation of the MPS PA Workstations
                      - Installation and Commissioning of the MPS PA
                      - Theory of closed loop technology
                      - Closed loop control of the level and flow using the computer
                      - Optimize the parameters for level and flow control using the computer
                      - Analogue in- and output normalization
                      - Closed loop control of the level, pressure and flow with the PLC

Competencies: The participant ...
                      - is able to install and commission Process Automation stations
                      - understands the theory of closed loop technology
                      - is able to set-up a closed loop control by a computer
                      - is able to optimize the corresponding parameters for level and flow control
                      - understands the functions of analogue in- and outputs of a PLC
                      - is able to normalize the signals of analogue in- and outputs
                      - is able to plan, edit and test a closed loop control with a PLC

Prerequisites: Completion of PLC 233

Duration: 3 days

Order Number: FACT-CLC241-1012

Nile University

Contact Data

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