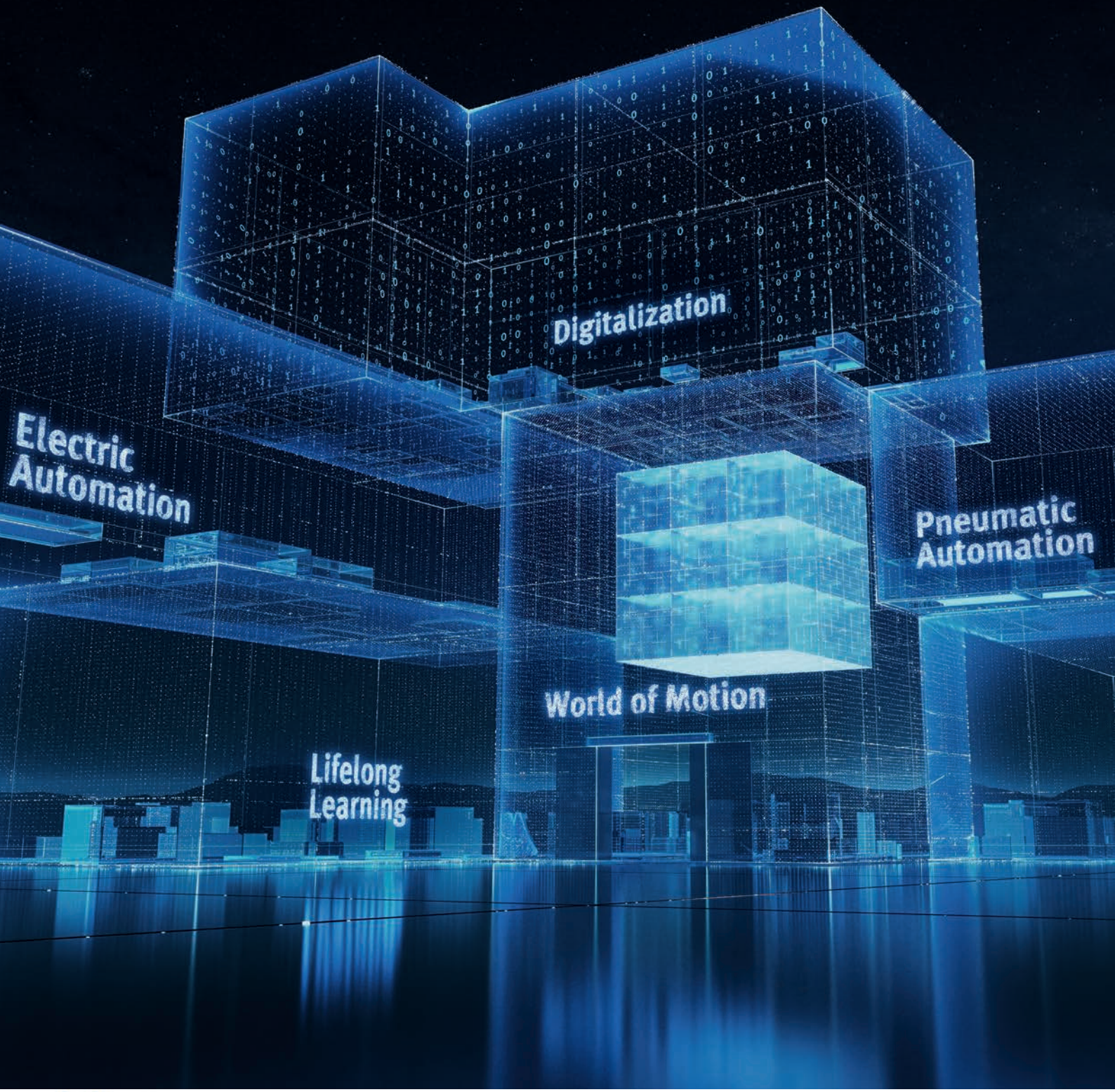
Training Courses

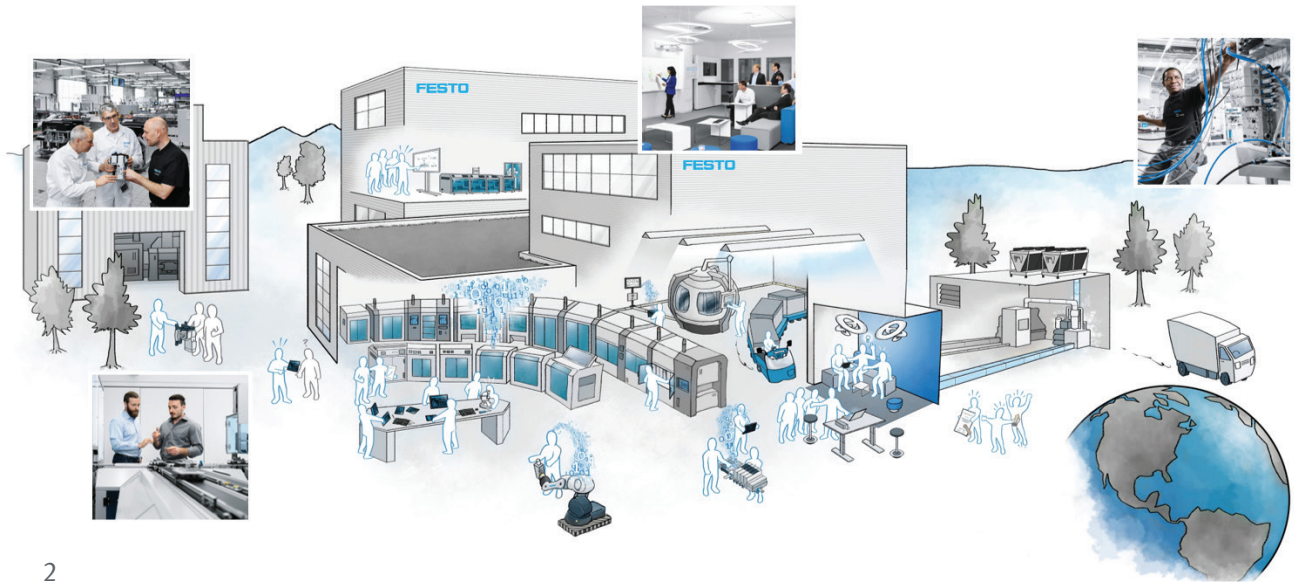
Competence Development towards Digitalisation

FESTO



100 years

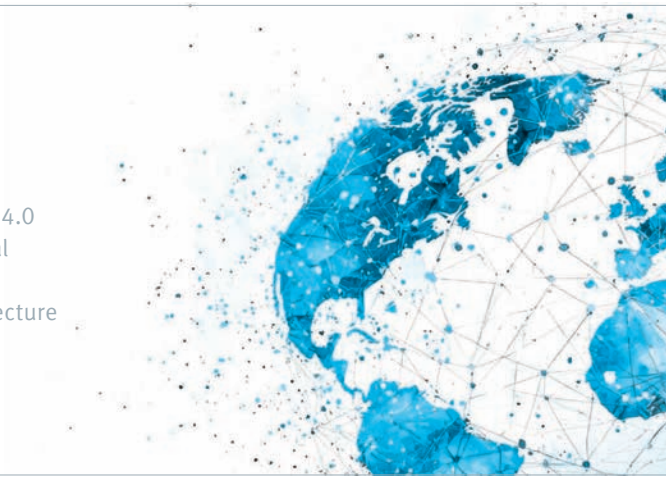
Education for a world in motion.


FESTO
FESTO

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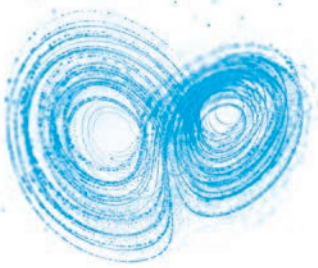
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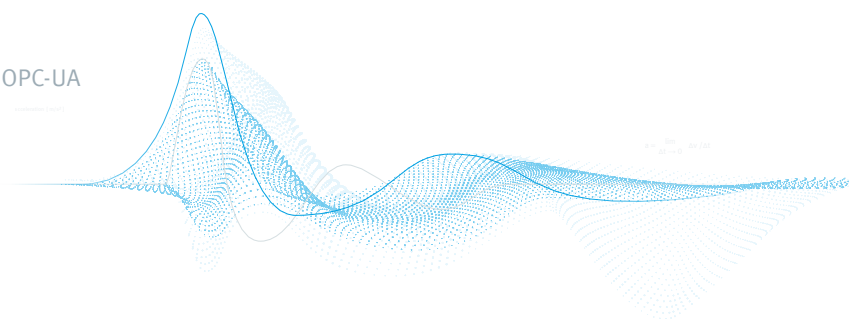


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Festo Group

Festo is a world leading German company specialising in industrial control and automation, with a wide product range and services providing automation solution to the many different industries in many countries. Established in 1925, the independent family-owned company based in Esslingen a.N., Germany, has been a driving force in automation for over 60 years.

Festo Didactic provides state-of-the-art training solutions for industrial companies and educational institutions worldwide. The product and service portfolio offer customers holistic education solutions for all areas of technology in factory and process automation. Festo Didactic is the world leader in technical education and a global partner for competence development.

Festo Engagement in Industry 4.0

On the way to the production of the future
Festo has a holistic view of the changes in the production world in various perspectives from change and competence management of human resource in the company to process optimisation with emerging digital technologies.

With holistic digitalisation approach from integrating Industry 4.0 practice into Festo new Scharnhaussen Technology Plant to smart products, digital services, AI and the Industry 4.0 training programme offered by Festo Didactic.

Active networking activities and development of standards
Festo is in close co-operation with industry associates to help create the basis for a uniform understanding of the concept of Industry 4.0 and technological standards.

Festo is a member of

- Plattform Industrie 4.0
- Automation Markup Language (AutomationML)
- Labs Network Industrie 4.0
- OPC Foundation



Industry 4.0

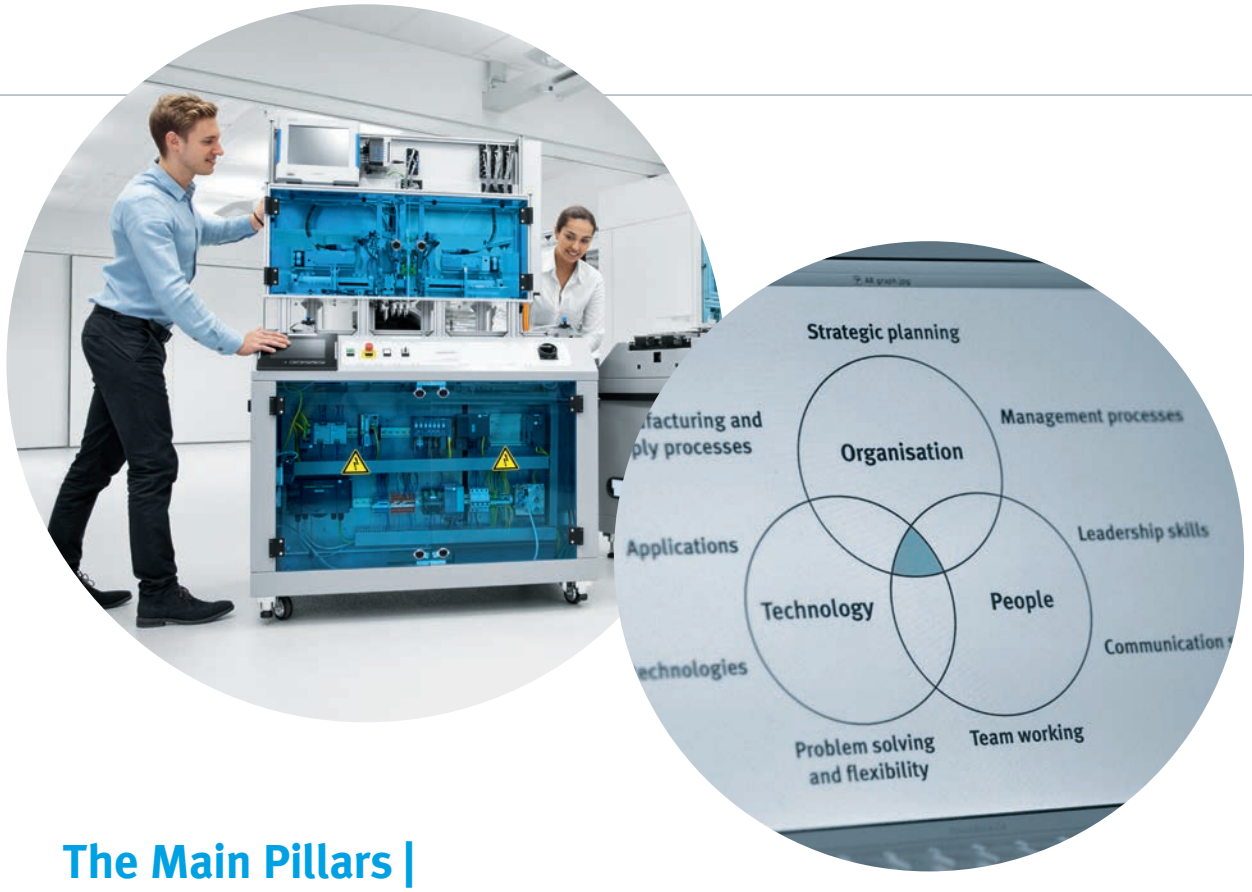


“The Paradigm Shift to the Production of the Future”

The fourth industrial revolution integrates automation technology and information technology to enhance productivity, efficiency and flexibility in manufacturing processes.

With a high focus on data and connectivity among people and machines, Industry 4.0 technologies enable organisations to become more sustainable and adaptive to changes in market demand.

The driving factors behind this revolution are technology, processes and people.



The Main Pillars |
People • Process • Technology

Engineered by people

People remain a crucial success factor in the adoption of Industry 4.0. It is essential for companies to develop transformation roadmaps and strengthen their workforce's skill sets to keep abreast of technological advancements.

The result will be well worth the effort: a thriving organisation and a productive, empowered, and fully engaged workforce.

Driven by process excellence

To maximise the value that Industry 4.0 technology brings, effective and well designed processes must be in place to connect and streamline business activities, and make sure that resources are put to their optimum use.

Powered by technology

Smart factories are now a reality thanks to various digital technologies. By harnessing these innovations, factories can run autonomously as well as aid manufacturers in decision-making. Industry 4.0 technologies also permit decentralised control of production.

Practice-Oriented Training and Qualification

from **Fundamental Technology** to **Industry 4.0**

Festo Training Centre Singapore: A Regional Hub for Future-Ready Industrial Skills
Festo Training Centre in Singapore serves as a leading regional training hub, delivering world-class industrial education to learners across Southeast Asia and beyond. Strategically located and equipped with state-of-the-art facilities, the Centre plays a pivotal role in enhancing workforce capabilities throughout the region. Its training programmes are meticulously designed to address the evolving demands of modern industry, ranging from foundational technologies to advanced Industry 4.0 competencies.

At the heart of its curriculum are fundamental courses in fluid power technologies, including pneumatics, hydraulics, and sensorics—core knowledge areas essential for anyone involved in industrial automation. These foundational modules provide the critical building blocks for more advanced learning and are indispensable for developing a skilled and adaptable workforce.

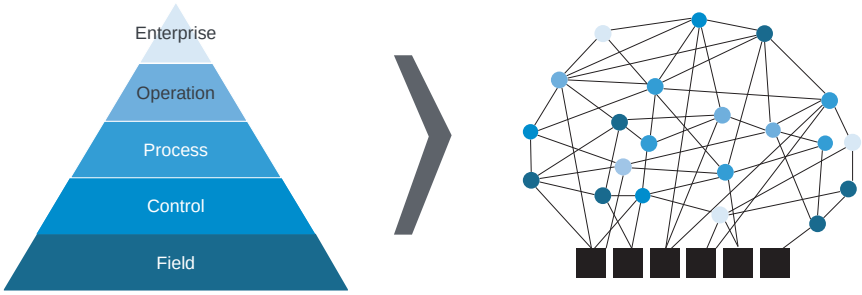
Building upon this foundation, learners can progress to the Mechatronics stream, where they gain practical experience with programmable logic controllers (PLCs) and automation systems. This stage bridges conventional industrial practices with contemporary control technologies, preparing learners for more complex systems integration.

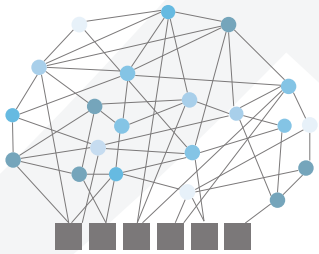
As industries across the region embrace Industry 4.0, the demand for a digitally proficient workforce becomes increasingly urgent. Festo's advanced training offerings meet this need by focusing on smart manufacturing, digitalisation, cyber-physical systems, and data-driven production environments. These courses empower professionals to lead digital transformation initiatives and support the development of innovative, future-ready business models.

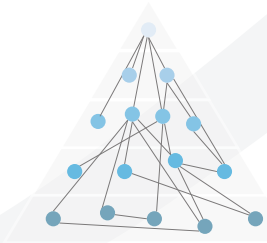
Through a structured and progressive learning pathway, Festo Training Centre Singapore enables learners to evolve from mastering core industrial technologies to becoming proficient in the latest Industry 4.0 innovations. Its role as a regional centre of excellence ensures that organisations and individuals across Asia have access to the expertise and tools required to succeed in the future of work.

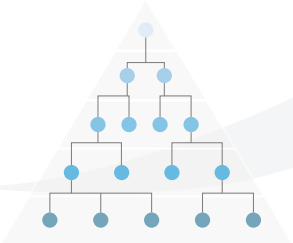


from **Classic Automation Pyramid** to **Network-Oriented Architecture**









Fundamental Technology

- Pneumatic System
- Hydraulic System
- Pneumatic Design
- Hydraulic Design
- Sensors
- Maintenance

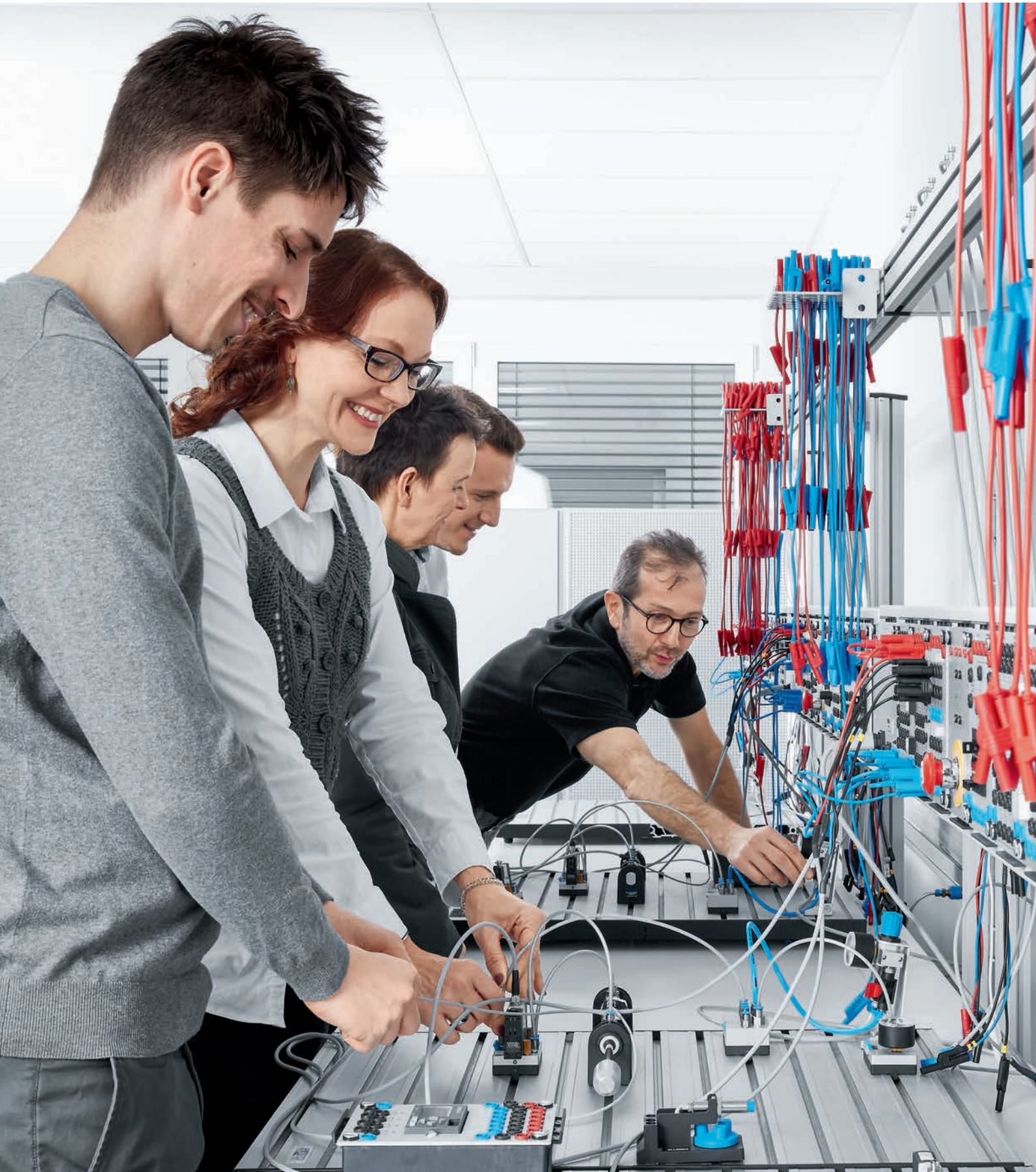
Mechatronics

- Basic PLC
- Robotic System
- Advanced PLC
- HMI
- Servo/Stepper Control
- Industrial Networking

Industry 4.0

- Horizontal Integration
- Digital Transformation
- OPC-UA
- Augmented Reality
- LEAN and Industry 4.0
- Autonomous Robotic
- Cyber Physical System
- Node-Red Programming
- Internet of Things
- Smart Sensor & IO-Link
- Smart Manufacturing with RFID
- Manufacturing Execution System

Fundamental Technology



TFP-11 Understanding Pneumatic Technology in Automation

WSQ course - with SkillsFuture funding up to 70%

Course Description
This course is catered to participants with no or some basic skills in handling pneumatic systems in industrial automation plants or equipment. The participant will be provided with an understanding of pneumatic and electro-pneumatic systems. Participants will be familiar with the design, construction and operation of pneumatic components. This includes the interpretation of circuit diagrams and symbols as well as the construction of simple pneumatic circuits.

Course Outcomes
Participants are able to
- Understand the characteristics of pneumatic and electro-pneumatic systems
- Understand the fundamentals of compressed air generation
- Identify and describe the design, features and operation of pneumatic components
- Identify and explain symbols for pneumatic components
- Identify and describe the design, features and operation of electric components
- Design, assemble and test basic pneumatic circuits
- Understand the operation of pneumatic sequencing circuits

Course Contents
- Characteristics of pneumatic systems
- Compressed air generation, distribution and preparation
- Construction and principle of pneumatic valves
- Construction and principle of pneumatic working elements
- Basic pneumatic circuits
- Characteristics of electro-pneumatic systems
- Components and assemblies in the electrical signal control section
- Construction and principle of the electrical elements
- ISO fluid power symbols according to ISO 1219
- Development and layout of simple controls
- Operation of pneumatic sequencing circuits
- Simulation and practical exercises

Course Duration – 32 hours

TFP-21 TPM of Pneumatic Systems

WSQ course - with SkillsFuture funding up to 70%

Course Description
This course is catered to participants with no or some basic skills in handling pneumatic systems in industrial automation plants or equipment. Participants will gain the knowledge of understanding pneumatic systems from the maintenance perspective, a systematic approach to maintenance, troubleshooting. Basic designs of pneumatic circuits are also practised.

Course Outcomes
Participants are able to
- Identify and describe the design, features and operation of pneumatic components
- Understand the design, features and operation of the components needed for compressed air preparation.
- Identify and describe the design, features and operation of pneumatic components
- Identify and describe the design, features and operation of electric components
- Understand the common failures of components
- Know the characteristics and behaviours of failing components
- Identify root causes of component failures
- Design pneumatic and electro-pneumatic circuits
- Setup, commission and test pneumatic and electro-pneumatic systems
- Maintain and troubleshoot pneumatic components and basic control systems
- Troubleshoot various pneumatic circuits

Course Contents
- Compressed air generation and distribution
- Function and construction of pneumatic control valves
- Function and construction of pneumatic actuators
- Methods for the development of pneumatic systems
- Maintenance requirements of pneumatic systems
- Operation of pneumatic sequencing circuits
- Design pneumatic circuits using cascade control method
- Function and construction of switches and contacts
- Function and construction of electrical sensors
- Function and construction of solenoid operated directional control valves
- ISO fluid power symbols according to ISO 1219
- Designing electro-pneumatic circuits
- Basic troubleshooting of pneumatic circuits
- Simulation and practical exercises

Course Duration – 32 hours

TFP-33 Advanced Design of Pneumatic Systems

Course Description
This course is catered to participants with a wider knowledge of complex pneumatic and electro-pneumatic control systems as well as to develop the ability to design, assemble and operate the controls. Participants would be able to design and assemble circuits with additional conditions.

Course Outcomes
Participants are able to
- Recap the components used in pneumatic and electro-pneumatic systems
- Design and test complex pneumatic and electro-pneumatic circuits
- Understand the different designing methods and their applications.
- Design circuits with 4 cylinders or more
- Setup and commission pneumatic and electro-pneumatic systems
- Troubleshoot various pneumatic circuits

Course Contents
- Functions and characteristics of pneumatic components
- Functions and characteristics of electro-pneumatic components
- Fundamentals and definitions in control technology: Signal flow and control chain
- ISO fluid power symbols according to ISO 1219
- Basic circuits of pneumatic systems
- Types of control: sequence control and opposing signals circuits
- Sequence control system
- Methods of designing circuit diagrams for pneumatic controls; cascade method and shift register method
- Basic circuits of electro-pneumatic systems
- Methods of designing circuit diagrams for electro-pneumatic controls; electrical cascade, shift register and stepper methods
- Sequence control with auxiliary conditions
- Simulation and practical exercises

Course Duration – 24 hours

TFH-11 Operate Hydraulic Systems

WSQ course - with SkillsFuture funding up to 70%

Course Description
This course is catered to participants with no or some basic skills in handling hydraulic and electro-hydraulic systems in industries. Participants will be provided with the basic knowledge of the construction and function of hydraulic and electric components as well as to develop the ability to read, design and construct simple hydraulic circuits.

Course Outcomes
Participants are able to
- Understand the characteristics of hydraulic and electro-hydraulic systems
- Understand the physical principles of hydraulics
- Identify and describe the construction, design features, and operation of hydraulic components
- Identify and explain graphical symbols for hydraulic components
- Identify and describe the design, features and operation of electric components
- Design, assemble and test basic hydraulic circuits

Course Contents
- Fundamental physical principles of hydraulics
- Hydraulic systems
- Components of hydraulic power pack
- Characteristics and function of hydraulic actuators
- Characteristics and function of pressure control valves
- Characteristics and function of directional control valves
- Characteristics and function of flow control valves
- Characteristics and function of non-return valves
- Construction and principle of electrical switches, contacts and electrical sensors
- Characteristics and function of solenoid operated directional control valves
- ISO fluid power symbols according to ISO 1219
- Development and layout of simple controls
- Design and assemble basic hydraulic circuits
- Design and assemble basic electro-hydraulic circuits
- Simulation and practical exercises

Course Duration – 32 hours



TFH-21 Maintain and Repair Hydraulic Systems

WSQ course - with SkillsFuture funding up to 70%

Course Description
This course is catered to participants with no or some basic skills in handling hydraulic or electro-hydraulic systems in industrial plants or equipment. The participant will be taking care of the maintenance of the hydraulic systems. Participants will be provided with the knowledge of hydraulic control systems, a systematic approach to maintenance, troubleshooting and designing of hydraulic circuits.

Course Outcomes
Participants are able to
- Identify and describe the design, features and operation of hydraulic components
- Understand the design, features and operation of the components needed for the hydraulic power pack.
- Identify and describe the design, features and operation of hydraulic components
- Identify and describe the design, features and operation of electric components
- Understand the common failures of components
- Know the characteristics and behaviors of failing components
- Know the efficient maintenance methods
- Identify root causes of component failures
- Design hydraulic and electro hydraulic circuits
- Setup, commission and test hydraulic and electro-hydraulic systems
- Apply the principles and documentation for systematic troubleshooting in hydraulic circuits
- Read and analyse hydraulic circuit diagrams

Course Contents
- Basic principles of hydraulics
- Function and construction of components used in the power supply section
- Function and maintenance requirements of hydraulic components
- Function and maintenance of electrical components
- Fault identification and location
- Logical troubleshooting
- Maintenance requirements of hydraulic systems
- ISO fluid power symbols according to ISO 1219
- Development and layout of sequence controls
- Electrical logic functions
- Reading hydraulic circuit diagrams
- Simulation and practical exercises

Course Duration – 32 hours

TFH-33 Design Hydraulic Equipment and Systems

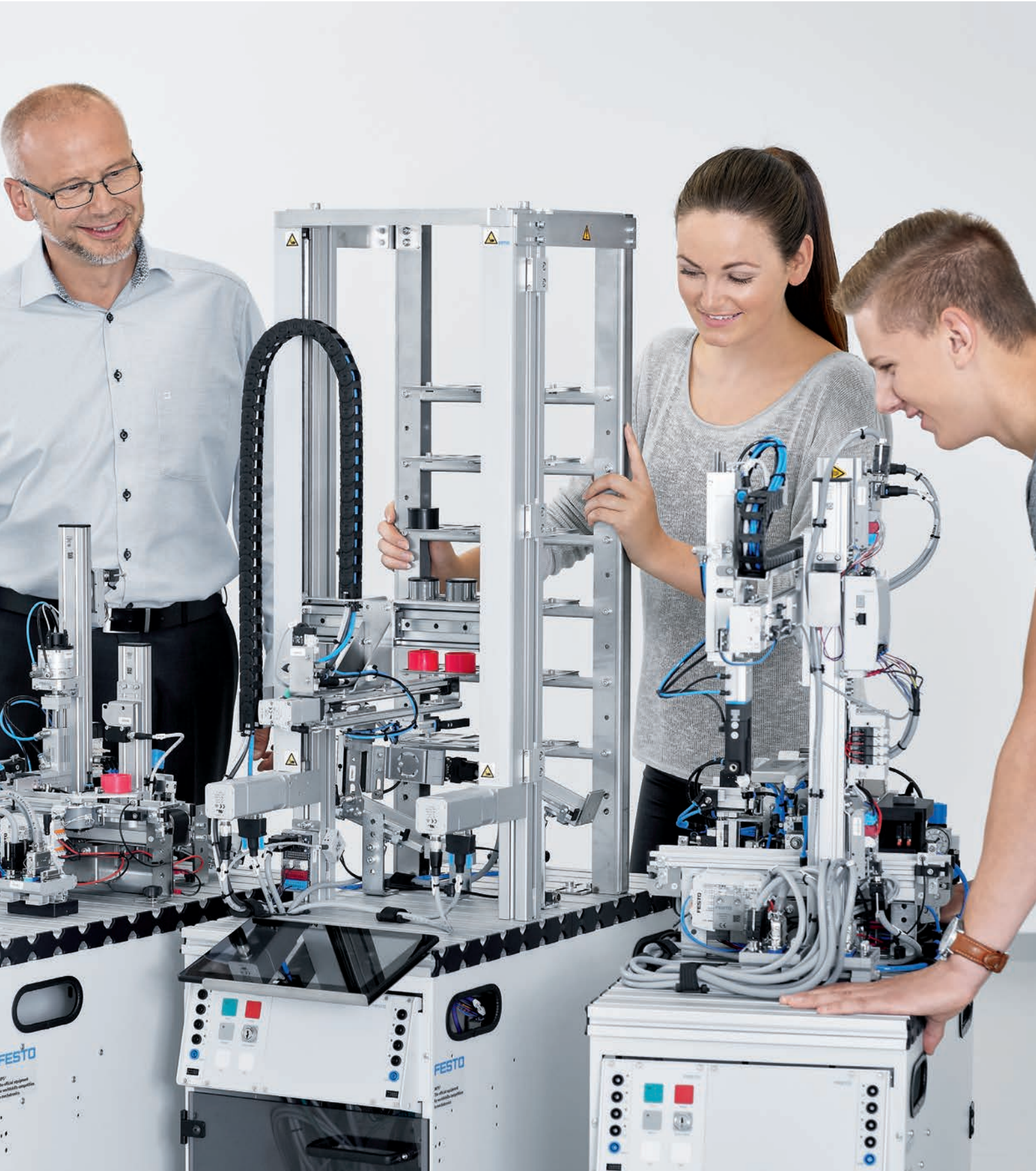
Course Description
This course is catered to participants with some basic skills in handling hydraulic and electro-hydraulic systems in industrial plants or equipment. Participants will be provided with a wider knowledge of complex hydraulic and electro-hydraulic control systems as well as to develop ability to design, assemble and operate the controls which enable the participant to read and assemble circuits with additional conditions.

Course Outcomes
Participants are able to
- Recap the components used in hydraulic and electro-hydraulic systems
- Design and test complex hydraulic and electro-hydraulic circuits
- Design hydraulic systems
- Understand the functions and uses of cartridge valves
- Setup and commission hydraulic and electro-hydraulic systems
- Troubleshoot various hydraulic circuits

Course Contents
- Fundamentals of hydraulics
- Basic principles and physical laws of hydraulics
- Characteristics and function of hydraulic actuators
- Characteristics and function of hydraulic valves
- Construction and principle of electrical components
- ISO fluid power symbols according to ISO 1219
- Hydraulic circuits
- Development and layout of control tasks
- Designing electro-hydraulic systems
- Control with auxiliary conditions
- Cartridge valves
- Simulation and practical exercises

Course Duration – 24 hours

Mechatronics



TCP-31 PLC Programming - Basic

WSQ course - with SkillsFuture funding up to 70%

Course Description
This course is catered to participants with no or some basic skills in handling Programmable Logic Controllers (PLC) in industrial automation plants or equipment. The participant will learn the input and output devices and the operation of the PLC. The participant would also be able to write, enter, and execute basic logic functions based on the IEC 61131-3 standard.

Course Outcomes
Participants are able to
- Understand the characteristics and applications of a PLC
- Know the design and mode of operation of a PLC
- Know the different input and output devices
- Identify the input and output signals from a PLC
- Read circuit diagrams
- Select PLC appropriately
- Understand the IEC 61131-3 PLC programming standard and the programming languages
- Be able to program the PLC
- Be able to commission and operate a PLC
- Be able to download the program to the Modular Production System and test the program

Course Contents
- Introduction to Programmable Logic Controllers (PLC)
- Design and mode of operation of a PLC
- Input and output devices
- Mechanical, pneumatic/hydraulic and man machine interface
- Reading of electrical circuit diagrams
- ISO symbols for signal, control and working elements according to ISO 1219
- Commissioning a PLC
- Programming Languages according to IEC 61131-3
- Programming of simple logic functions
- Basic programming with signal edges, setting and resetting, timers and counters
- Basic programming with linear sequencing
- Simulation and practical exercises

Course Duration – 32 hours

TCP-32 PLC Programming - Intermediate

Course Description
This course provides the participant with knowledge of construction and operation of a Programmable Logic Controller (PLC) and be able to translate control tasks into operational PLC programs. The participant would be able to write, enter, and execute application programs based on the IEC 61131-3 standard. The use of the Modular Production System (MPS) will give the participant practical programming and troubleshooting skills.

Course Outcomes
Participants are able to
- Understand the purpose, functions, and operations of a PLC
- Understand the classification of control systems
- Know the Input/output systems of PLC
- Know IEC 61131-3 and the programming languages
- Know the peripheral devices and interfacing
- Understand what is needed when selecting a PLC
- Use the PLC programming software
- Create a PLC project using PLC software
- Program basic logic functions with the PLC
- Program using signal edges, setting and resetting outputs, timers and counters with the PLC
- Write sequencing programs with the PLC
- Add additional requirements to the PLC program
- Commission and operate a PLC
- Design function blocks
- Write programs for automation lines
- Download the program to the Modular Production System (MPS) and test the program
- Communicate between the stations of the MPS

Course Contents
- Functions and applications of PLC
- Components of a PLC and PLC addresses
- Programming Languages according to IEC 61131-3
- Procedure for creating a PLC program
- Programming of control task from logic functions to sequencing
- Programming additional tasks
- Programming of modular production systems
- Multitasking with the PLC
- Communication between PLCs
- Testing the system
- Simulation and practical exercises

Course Duration – 24 hours

TCP-33 PLC Programming with HMI and Profinet Communication

Course Description
This course will cover the advanced applications of Programmable Logic Controller (PLC) operations and programming techniques. PLC data structures will be presented. The participant will write, enter, and execute application programs using the programmable controllers and Human Machine Interface (HMI). The use of the Cyber Physical System will provide the participant practical programming and troubleshooting skills used in automated systems.

Course Outcomes
Participants are able to
- Understand the purpose, functions, and operations of a PLC
- Know IEC 61131-3 and the programming languages
- Use the PLC programming software
- Create a PLC project using PLC software
- Program basic logic functions with the PLC
- Program using signal edges, setting and resetting outputs, timers and counters with the PLC
- Write sequencing programs with the PLC
- Commission and operate a PLC
- Design function blocks
- Write programs for automation lines
- Design the components in the HMI
- Do HMI programming and link to the CP Lab
- Download the program to the Cyber Physical Lab (CP Lab) application modules and test the program
- Communicate between the stations of the CP Lab using Profinet

Course Content
- Introduction to a PLC: hardware and software, programming device, general structure of PLC program
- PLC data type and addressing
- Commissioning a PLC
- Programming of control task
- Multitasking with the PLC
- Sequence control systems
- Structured programming
- Human Machine Interface (HMI)
- Industrial communication and networking
- Machine-to-machine communication via Profinet
- Simulation and practical exercises

Course Duration – 24 hours

TCR-32A Basic Programming and Operation of Industrial Robots

Course Description
Robots remain an important part of automation and have increasingly played a vital role in improving process efficiency in the manufacturing industry.

This course provides a good overview of the essential knowledge about robotic automation, where participants will gain foundational knowledge in handling systems, end effector components, and various types of industrial robot systems.

Course Outcomes
Participants are able to
- Identify different types of handling systems used in automation
- Understand the fundamentals of robotics
- Understand the mechanics behind robotic systems
- Explain the working principles behind the control of industrial robot movement and speed
- Develop, download, and test basic robot programs

Course Contents
- Introduction to industrial robots and their applications in the automation industry
- Industrial robot terminologies
- Robot coordinate systems and path control
- Handling systems with vacuum and grippers
- Simulation and practical exercises

Course Duration – 16 hours

TCR-32B Practical Collaborative Robot with Vision System

Course Description
This hands-on course introduces participants to collaborative robotic automation with a focus on vision system integration. It covers essential concepts in robot operation, programming logic, and vision-guided applications. Through practical exercises and real-world scenarios, gaining the skills needed to deploy collaborative robots effectively in industrial environments.

Course Outcomes
Participants are able to
- Understand collaborative robot principles and safe operation
- Operate and program a collaborative robot using a visual interface
- Perform basic movements and teach robot positions
- Control program flow and manage I/O for external devices
- Apply fundamental programming logic for automation task
- Calibrate and use a vision system for object detection
- Integrate motion and vision to complete complex tasks
- Develop, test, and troubleshoot functional robot programs

Course Contents
- Introduction to collaborative robots and safety principles
- Overview of robot hardware and programming interface
- Basic robot operation, movement, and point teaching
- Program control flow and input/output management
- Core programming logic using conditional and loop structures
- Vision system calibration and object recognition tasks
- Integration of motion and vision for more complex tasks
- Practical troubleshooting and validation of robot programs

Course Duration – 16 hours

TCM-12 Fundamentals of Electric Drives and Electromechanical Systems

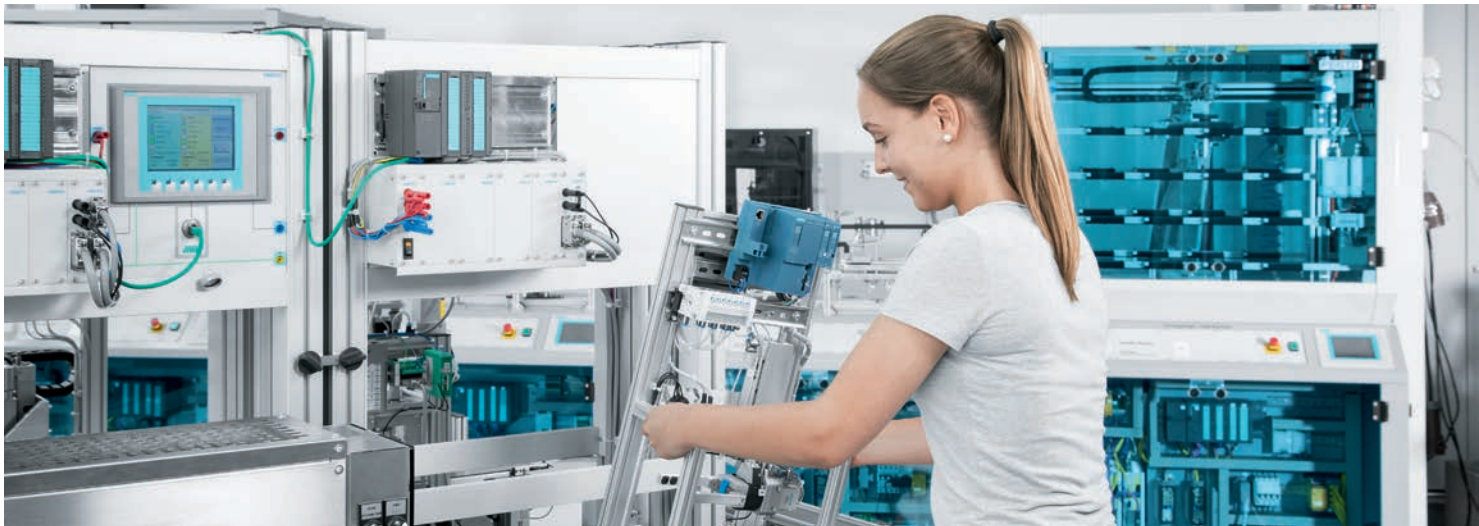
WSQ course - with SkillsFuture funding up to 70%

Course Description
This course will cover the fundamental knowledge and skill on the different electric motors and the electro-mechanical drives. Participants will also be able to incorporate the motors to the electrical drive units and how it is used in the industry.

Course Outcomes
Participants are able to
- Explain the functional principles of motors
- Describe the functional principles of servo and stepper motors and controllers
- Understand the difference between the various types of encoders and identify their function and specific application
- Analyse a system consisting of different electric drives, controllers, brakes, gear boxes and explain their configuration and relationship
- Differentiate between the various types of mechanical drives (axes), and explain their construction
- Select the most appropriate components of an electrical drive for a given application
- Explain the relevant parameters of the configuration software and their effect on the drive system
- Work safely with an electrical drive and demonstrate the desire to conform with safe practice

Course Contents
- Introduction to electrical motors
- Types of industrial motors: DC motors and AC motors
- Stepper motors
- Servo motors
- Electromechanical system
- Complete systems
- Simulation and practical exercises

Course Duration – 32 hours



Industry 4.0


Rockwell FactoryTalk
Festo Dashboards
Siemens MindSphere
Rockwell CL
CPX-IOT
PROFINET
EtherNet/IP
CMMP-AS
CPX-CEC VTEM
Terminal CPX
CPX-E

GID-11 Fundamentals of Industry 4.0 & Its Core Elements

Course Description
This course provides the fundamentals of industrial revolutions and the holistic perspective of the underlying concept of Industry 4.0 – a paradigm shift to the production of the future that integrates automation technology and information technology to enhance productivity, efficiency and flexibility in manufacturing processes.

Course Outcomes
Participants are able to
- Understand the development of industrial revolution towards Industry 4.0
- Identify the benefits of data-driven manufacturing process for flexible process design
- Recognise the opportunities for developing new business models and what to consider when implementing new strategies towards Industry 4.0
- Understand the important relationship between people, process, and technology to harness the full potential of Industry 4.0

Course Contents
- Fundamental concept of Industry 4.0
- Key differences between Industry 3.0 and 4.0
- Overview of the core elements and technologies of Industry 4.0
  - Radio Frequency Identification System
  - Human-Machine Interface, HMI
  - Machine-to-Machine M2M Communication
  - Vertical and Horizontal Integration
  - Augmented reality
- Demonstration of features and benefits of integrated automation with Industry 4.0 technologies
- Social-technological developments and the consequences
- Industry 4.0 implementation approach
- Industry 4.0-driven competency development and change management

Course Duration – 24 hours

TPM-11 Digitalising Operation with Manufacturing Execution System (MES)

Course Description
In this course, participants will be introduced to Manufacturing Execution System (MES) - a very critical component of Industry 4.0 in order to achieve the end-to-end digitisation objective by acting as a bridge between the factory floor and the ERP system.

Course Outcomes
Participants are able to
- Understand the core functions of MES
- Recognise the benefits of MES for flexible production control
- Can manage production resources
- Able to create new production workplan to customise production process for new production requirements
- Understand the importance of MES for production management in Smart Factory or Advanced Manufacturing

Course Contents
- Introduction to MES
- Production Operation in Default Mode vs MES Mode
- Using MES for
  - Production Management
  - Resource Management
  - Order Management
  - Quality Management
- Practical exercises for Production Management of CP-Lab

Course Duration – 24 hours

TUC-11 Integrated Automation with Cyber Physical System

Course Description
In this course, participants will be introduced to Cyber Physical Production System (CPPS) made up of integrated automation with various technologies eg..MES, smart or intelligent product, internet of things, condition monitoring, augmented reality, etc. The modular design of the CPPS with open network architecture and decentralised control provide the flexibility of various system configurations that are essential for production of the future.

Course Outcomes
Participants are able to
- Understand the design structure of a cyber physical system.
- Understand the importance of modular design with decentralised control structure for greater flexibility in production configuration.
- Can retrofit smart sensor to provide more insight of the operation status of production machinery.
- Recognise the benefits of condition monitoring for predictive maintenance
- Can integrate augmented reality to enhance operation efficiency of the worker

Course Contents
- Introduction to Cyber Physical System
- Asset Administration Shell
- Overall system architecture of Cyber Physical Lab
- Modularity and decentralised control
- Application of smart sensor in the production floor
- Application of augmented reality to enhance the work efficiency
- Installation of condition monitoring

Course Duration – 24 hours

TCD-31 Smart Manufacturing with RFID System

Course Description
Smart Manufacturing entails fully integrated & collaborative manufacturing system with high focus on data and seamless connectivity responding in real time the changing demand in the Smart Factory.

This course provides the fundamentals of RFID technology and how to use it to transfer data in production allowing flexible production configuration which contributes to flexibility & adaptability – a feature highly needed for lot size one production.

Course Outcomes
Participants are able to
- Understand the different identification methods such as binary code, QR code and RFID
- Identify the right identification method for the right application
- Integrate RFID to incorporate data into automation process driving towards Smart Manufacturing.
- Communicate data with RFID using Programmable Logic Controller

Course Contents
- Fundamentals of RFID
- Selection of RFID for different applications
- Benefits of using RFID to incorporate data into automation processes
- Programming the Programmable Logic Controller (PLC) to read data from the RFID tag
- Programming the PLC to write data to the RFID tag

Course Duration – 16 hours

TFS-31 Smart Sensor with IO-Link

Course Description
Sensors are the crucial component in one of the biggest trends in technology: the digital transformation. As the IIOT (Industrial Internet of Things) is now gathering momentum globally, sensors get smarter.

Many digital transformation solutions are simple implementations of smart sensor technology. Industry 4.0 workers need to understand this technology to reap its full benefits.

This course will get your plant or factory on the fast track to digital transformation by using the enhanced sensor features instead of paying for the costly development process and long implementation.

Course Outcomes
Participants are able to
- Understand the basics of smart sensors through a project-oriented exercise to integrate them in the automation processes.
- Know the operating principles and characteristics of the various types of sensors used in the manufacturing industry.
- Understand the benefits of smart sensors in the context of Industry 4.0 & able to setup and integrate them into different manufacturing processes to enhance operational efficiency such as predictive maintenance.
- Use the practical, easy-to-implement steps to make digital transformation a reality.
- Setup a sensor connection and communicate via IO- Link and Wireless connection
- Know the parameters of smart sensors for process optimisation and predictive maintenance.
- Make the job of the personnel easier by automatic data collection, monitoring, and interpretation using smart sensors

Course Contents
- Smart sensor fundamentals
- Fundamentals and setup of IO-Link communication protocol
- Advantages of smart sensors over typical sensors
- Parameterisation and predictive maintenance
- Selection and easy replacement of sensors in the field
- Setup wireless monitoring and display dashboards
- Integrate smart sensors in different manufacturing processes
- Hands on simulation and practical exercises

Course Duration – 16 hours

TCN-31 Industrial Ethernet Networking with Profinet and OPC-UA

Course Description
The paradigm shift of manufacturing into data-driven automation puts strong emphasis of data connectivity between systems and devices driving towards a whole new dimension of networked automation.

PROFINET as one of the leading Industrial Ethernet standard which are widely used in the industry and OPC-UA, the internationally established communication standard for Industry 4.0 enables data exchange across all automation levels.

This course provides a good overview with hands-on practical exercises on the state-of-the-art learning equipment Modular Production System.

Course Outcomes
Participants are able to
- Understand the technology of PROFINET & OPC-UA for data communication in industrial automation
- Know the basics of industrial ethernet networking
- Use PROFINET protocol to control and monitor field devices
- Establish a machine-to-machine communication
- Carry out real time data access via OPC-UA

Course Contents
- The basics of industrial networking concept
- Overview and fundamentals of Industrial Network
- Fundamentals and components of a PROFINET network
- How to control field IO device via PROFINET
- Machine to Machine (M2M) Communication via PROFINET
- Fundamentals of OPC-UA
- Data access via OPC-UA

Course Duration – 16 hours

TUN-31 Data Visualisation with Node-RED Programming

Course Description
Node-Red is a flow-based development tool for visual programming using a palettte of nodes with built-in functionality that can be connected to other nodes for design applications.

This course provides basic knowledge of Node-Red and its application and teaches you how to use dashboard nodes to visualise data retrieved from a machine and the state-of-the-art training equipment Modular Production System will be used.

Course Outcomes
Participants are able to
- Understand the basic knowledge of Node-Red
- Setup communication between Node-Red and Programmable Logic Controller (PLC)
- Collect real-time data collection from the PLC with Node-Red
- Design dashboard for control and data visualisation

Course Contents
- Overview of OT and IT convergence
- Introduction of Node-Red
- Configuration and setup of flow-based development tool
- Familiarisation of flow-based programming
- Flow-based programming hands-on practical experience to visualise machine data with the use of the state-of-the-art training equipment Modular Production System

Course Duration – 24 hours

TII-31 Practical AI in Manufacturing

Course Description
This course offers a practical introduction to the application of Artificial Intelligence (AI) in modern manufacturing environments. Designed for professionals aiming to implement smart technologies on the shop floor, the course blends foundational theory with hands-on exercises focused on real-world use cases. Participants will gain the skills to connect with production machines, collect and model operational data, and deploy AI for predictive maintenance, quality control, and energy efficiency improvements

Course Outcomes
Participants are able to
- Understand the fundamentals of AI and its relevance in manufacturing.
- Identify key AI applications such as predictive maintenance, quality control, and energy optimisation.
- Connect to production machine controllers and extract operational data.
- Collect, record, and prepare data for AI model training.
- Develop and train basic AI models using manufacturing data.
- Apply trained AI models to practical manufacturing scenarios.
- Gain confidence in implementing AI-enabled improvements on the production floor

Course Contents
- AI fundamentals & data acquisition
- Overview of AI techniques: machine learning, deep learning
- Goals of AI in manufacturing: efficiency, reliability, cost reduction
- Predictive maintenance, quality control, energy efficiency
- Introduction to machine controllers and connectivity via OPC-UA with practical implementation using Node-RED.
- Real-time data collection and management of machine data
- Training AI models
- Deploy trained models to detect failure patterns

Course Duration – 16 hours

General Information

Enquiry

For registration, general information and customisation of training courses, please contact us

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Withdrawal

Any request for withdrawal must be made in written and received at least 3 working days before course commencement date.

Workforce Skills Qualification courses

A Workforce Skills Qualification (WSQ) Statement of Attainment will be issued upon completion and passing the assessment.

WSQ Courses are eligible for Workfare Skills Support (WSS Scheme) and Mid-Career Enhanced Subsidy (MCES).

Subsidy Type		
Normal		Mid-Career Enhanced Subsidy (MCES)
Employer sponsored	Self-sponsored	
Singapore Citizens (SCs) aged ≤ 39 years / Singapore Permanent Residents (PRs)	Singapore Citizens (SCs) aged 21 years to 39 years / Singapore Permanent Residents (PRs) aged ≥ 21 years	Employer / self-sponsored Singapore Citizens (SCs) aged ≥ 40 years

For more details, please visit
https://www.ssi.gov.sg/training/funding-information/skillsfuture-singapore-funding/



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