As a global partner for educational institutions, governments, state organizations and companies around the world, we design and implement training centers and laboratories, educational equipment and programs that train people to perform in highly dynamic and complex environments.

Our products and services are developed by a network of experts in the fields of industrial production, automation research and development, and didactics.

Festo Didactic is the world-leading provider in the field of technical education.
From industry – for industry

As a part of the Festo Group, Festo Didactic develops education and training solutions within the context of international research and educational institutions and the industry. With our direct access to the most recent technologies, and a broad variety of opportunities to evaluate new solutions, we are in an ideal position to bring new product and service developments to a level that will set international standards in qualification.

Our educational environments connect technical, organizational and skills training programs with advanced technical equipment and overall planning, operative and consulting services.

Our roots and our drive for worldwide success

The Festo Group’s path to becoming the leading international provider of solutions in automation and technical education is paved by the excellent achievements and collaborative efforts of its employees, who contribute to trend-setting innovations and standards all over the world. As a family-owned company, Festo consistently builds on the capabilities of its employees and invests in their development. Its holistic and far-sighted approach to competence building and education gave rise to the founding of a subsidiary company – Festo Didactic – that has built an international network of product development, production and sales facilities and is today the number one provider in the field of technical education worldwide. The goal of Festo Didactic is to maximize learning success in educational institutions and productivity in industrial companies around the globe.

Our goal is to maximize learning success and productivity.
How we maximize learning success and productivity

Upcoming technologies and rapid developments in changing economies create an urgent demand for a skilled workforce in manufacturing and services. To operate efficiently and to find opportunities and solutions in new technologies, a skilled workforce needs both practical experience and fundamental knowledge of advanced technologies. Practical experience in industrial environments helps students connect theoretical knowledge with the real demands of production. It prepares them to actively and responsibly solve problems, to adapt quickly to changing demands, and to contribute to the productivity of the company they work for. We supply educational institutions and companies with learning environments that place students in real-life situations and enable them to quickly gain practical experience of high-tech components and technologies used in manufacturing.

Our learning environments cover all relevant technological fields and are complemented by training programs on problem solving, and organizational, social, and leadership skills.

The benefits of our learning environments:
- balanced didactic content
- practical experience
- real-life industrial components
- intuitive approaches to problem-solving

Hands-on learning environments help staff and students learn quickly and effectively—and boost company productivity.
Managed services: development of training centers

Design and equipment of laboratories, schools, universities and training centers

Development of curricula, programs and certification

Educational and consulting services for the industry

Global solutions for all fields and aspects of technical education and competence building

Festo Didactic SE
- Private educational institutions
- Founded in 1965
- More than 900 employees
- Core locations in Germany, Canada and USA
- Festo offices in 60 countries
- Representations in many other regions

Customers
- Colleges, universities, and vocational schools
- Private educational institutions
- Governments and government institutions
- Industrial companies
The number of young people in search of employment is growing. But all too often, vocational training and education programs in schools and in universities fail to give students the skills they need, leaving them unprepared for the job market. On the other hand, as markets change and become more complex, local and global manufacturers from a wide range of fields and backgrounds need appropriately skilled workers. And their demand is increasing.

Practical vocational education and training programs offer students early hands-on work experience and increase the employability of young adults entering the job market and skilled staff in need of further training.

The demand for practice-oriented learning solutions among educational institutions and governments ranges from basic learning systems and training programs to dedicated full-scale training centers.

Festo Didactic has developed internationally standardized education solutions and curricula for a wide range of technical job profiles. These include all technological fields and vocations and also new technological fields such as aquatronics (water and wastewater management), renewable energies and digital communication. In addition to the core technological fields relevant for factory and process automation, these new fields contribute to the development of sustainable economies, strengthen the know-how of companies and open up new job opportunities for skilled workers.
Today’s large industrial manufacturers produce goods in many different regions, often under very different conditions. But their products must still be made to the same exacting standard.

To ensure the success of their products and their production facilities, it is vital for producers to establish long-term qualification solutions at their production locations. One way to achieve this is by collaborating with external training partners and educational institutions.

At Festo Learning Centers, staff from all over the world can be trained to meet the same high standards. As a developer, Festo can provide complete managed services to meet individual requirements ranging from the design and equipping of laboratories and training centers, to the development of curricula, qualification programs and certification schemes, and service agreements including:

- Design of structural organization
- Process analysis and process design
- Process description
- Task and job descriptions
- Recruiting services

Market analysis
The development of educational programs begins with a market analysis to identify the capacity building demands of the local industry and determine the existing educational facilities and their direct competition.

Definition of vocations
Based on the analysis, vocations are defined that need to be established with complete curricula and certification cycles, as well as vocations that require further training.

Curricula development
Curricula for vocations are developed according to the national qualification framework. They have modular structures and integrate dual elements of theoretical knowledge and practical exercises.

Certification
The certification of students is an important part of every qualification program to document skills in nationally and, ideally, internationally recognized, comparable forms. Festo establishes certification schemes in cooperation with national associations and can additionally integrate German certification in cooperation with German associations.

Festo Didactic offers a range of services developed in partnership with the production facilities of the Festo Group and many other companies. Services include strategic skills development at industrial companies, lean management and process optimization, as well as the integrated planning of factory areas. Crucial factors in the planning and optimization of processes include developing target value streams, deducing fields of activity and the targeted qualification of employees.

Our services cover three skills areas – technology, organization and people – and three productivity factors – quality, time and cost.

- Target group specific training courses in automation technology: Pneumatics, hydraulics, mechatronics, sensor technology, robotics, BUS technologies, cyber-physical systems
- Value stream oriented layout design
- Bottleneck focused production control
- Smart maintenance
- Shop-floor management
- Learning in the learning factory
- Leadership and value creation
- Operative HR development
- Activating potential in quality improvement
- Structured problem solving

Festo Didactic develops training programs that lead to the qualification and certification of specific job profiles for all levels, including:

- Maintenance
- Service
- Production planning and controlling
- Train-the-Trainer
- Process optimization
- Leadership
The planning, designing and equipping of classrooms and laboratories are essential parts of the solutions provided by Festo Didactic. All laboratories carry a Festo seal of quality indicating compliance with global standards for learning equipment and didactic methods for technical training in industrial automation and mechatronics.

Services included in the equipment of laboratories are:

- Professional training equipment with industrial components
- Facility and laboratory planning
- Professional lab design
- Global procurement
- Installation and systems integration
- Train-the-Trainer, courseware
- Maintenance, on-site service
- Financial solutions

Labs for technological fields:

- Mechatronics/Robotics
- Electronics/Electrical engineering
- Fluid power
- CAD/CNC
- Mechanical workshop
- Industrial maintenance
- Refrigeration/HVAC
- Building system technology
- Communications and radar technology
- Renewable energies
- Environmental technology
- Water and wastewater management

Design and equipment of laboratories, schools, universities and training centers
The enormous rise in the quantity of data and in the complexity of plant networks and company divisions is changing our production processes and requiring new qualification solutions.

For the operation and ongoing optimization of facilities, and to maximize adaptability, one needs to communicate both a general understanding of digital, fully automated production technologies and in-depth knowledge of the structure and programming of digital facility networks.

The Festo Group takes a holistic approach: The company’s customers receive the newest networked automation technology with a maximum level of flexibility, safety and speed of delivery as well as full consultation and qualification services for “lean and digital production.” Educational institutions receive learning systems and programs that prepare skilled staff for digital production.

All solutions are modular in structure. Practical training in the use of new technologies is conducted using the cyber-physical learning and research platform “CP Factory.” The platform replicates the workstations of a real production facility and makes it possible to learn how to program facilities, set up networks and optimize many other aspects such as energy efficiency and data management. In addition, the CP Factory can also be used to develop and test flexible software solutions prior to their implementation in practice in the production facility.

The CP Factory is part of a holistic learning factory solution—a modular learning environment that can be used to qualify personnel in the operation of a particular production process or in a particular field of work, such as production technology. In so-called “One-Point Lessons” skilled workers and management staff are trained at frequent intervals by internal or external experts in practical aspects of current requirements—for example in the fields of energy management, process optimization, IT management or in the training of skilled staff themselves.

Range of topics: Industry 4.0

Technology
- Human-Machine Interaction (HMI) in Industry 4.0
- Basics of Industry 4.0 product identification
- The basics of PLC technology
- Integrating applications into PLC projects
- Integrating human-machine interfaces (HMIs) into TIA and LOGO! projects
- Communication in PLC projects

Maintenance, production and process optimization
- The Basics of production planning and management for Industry 4.0 plants
- Serious games: Synchro meets Industry 4.0 – take advantage of the opportunities
- The basics of condition monitoring
- Predictive and usage-dependent maintenance

Leadership
- Industry 4.0 – Recognizing potentials/developing one’s own strategy
- IT-Safety and privacy: Threats, concepts and solutions
- Industry 4.0 – work and organizational psychological aspects

Vocational training
- Technologies of the CP factory
- Industry 4.0 applications with the CP factory
- Focus Industry 4.0 – new ways of thinking in apprenticeship
Communications and radar technology

Example of a technology field

In today's connected world, communications play a crucial role in our daily lives, in industry and infrastructures. Telecommunications allow the transmission of signals and data from one point to another via radio, optical, or other electromagnetic systems. Radars are object-detection systems that use radio waves to determine the speed and position of objects for a wide variety of purposes. Both radars and telecommunications share similar technologies and require the same fundamental knowledge.

Because they belong to high-tech sectors, radars and telecoms are directly impacted by evolving technologies, which allow a versatility that broadens their scope of applications across various industries. As these sectors expand, the demand for specialized workers in the design, development, and maintenance of such systems increases, requiring focused and applicable training. Hands-on practice plays a critical role in training success, yet radar and communications technologies are difficult and costly to reproduce in a classroom.

However, Festo Didactic has developed relevant and affordable training systems that address the needs of instructors in education and industry. High degrees of authenticity and pedagogical value coalesce into turnkey, innovative solutions, allowing trainees to acquire meaningful knowledge and practical skills. The training systems operate at safe power levels and integrate computer-based tools to create a secure, yet stimulating environment.

Software
- Simulators recreate communications training equipment on a screen, enabling students to install and connect virtual equipment, performing lab exercises as if they were in the actual laboratory.
- Modern and versatile computer-based tools allow for controlling parameters and settings of the training equipment, as well as measuring, observing, and analyzing signals in the systems.
- An Orbit Simulator provides 2D and 3D animated views of the Earth and orbiting satellites to enable student understanding of difficult-to-replicate, unfamiliar concepts.

Topics covered
- Satellite communications
- Antenna
- Radar
- Microwave technology
- Analog and digital modulation/demodulation
- Telephony
The electric power industry deals with the generation, transmission, and distribution of electricity—a major energy resource derived from primary sources, like coal, nuclear fission, gas, solar, hydropower, etc. The versatility of electricity allows its use in a wide range of applications, unquestionably playing an essential role in our modern world.

Technological developments bring about new challenges and opportunities for the industry. For example, to increase reliability, security, resilience, and efficiency of grids, infrastructure modernization is a necessity. This includes digitalization to make systems more interactive, dynamic, and information-based. Additionally, generation of electric power from greener, cleaner energy sources, like sun and wind, is strongly encouraged, so energy storage capabilities must be enhanced.

Given the importance of electric power, an increasing number of skilled and knowledgeable workers is required, highlighting the importance of sound training programs focused on realistic and practical learning. The Electric Power Technology program—a cornerstone of the offer from Festo Didactic—answers the increasingly diversified needs of technical schools, colleges, and universities, as well as industrial and utilities companies, for efficient training in the broad field of electrical energy. The program combines a modular approach to hardware and courseware with fully-customizable budget and training requirements.

**Hardware**
- The Electromechanical Training System (EMS) is the modular, educational hardware platform underpinning the Electric Power Technology program.

**Topics covered**
- Basics of electric power
- Rotating machines
- Power electronics
- Renewable energies
- Smart grid and power transmission
Alongside electrical and mechanical power, fluid power is a common method of power transmission that relies on the use of a fluid – liquid or gas – to generate, control, and transmit power. Hydraulics and pneumatics are used in a wide spectrum of industrial applications, driving and controlling mechanical motions to accomplish work.

Fluid power is closely interconnected with other technologies, such as mechatronics and automation, as hydraulic and pneumatic applications are at the heart of industrial systems. Consequently, a sound understanding of these technologies is a prerequisite for a large number of industry workers.

Challenges faced by engineers and technicians in this fast-growing field are numerous, ranging from improving systems and components efficiency, to increasing reliability, power density, and energy storage capabilities, to reducing environmental impact. Enhanced fluid power instruction is sure to shape the future of the industry.

Training packages cover a large range of topics, from basics to advanced subjects. The modular approach allows instructors to exactly match their needs and requirements, while also providing expansion possibilities.

### Topics of the fluid power learning systems
- Basic and advanced level training packages
- Proportional and closed-loop hydraulics and pneumatics
- Mobile hydraulic
- Supplementary sets for measurement technology, programmable logic controls, and error diagnostics
- Supplementary sets for sensor technology, drives, vacuum technology, and safety in pneumatics

### Software
- FluidSIM® has been the world’s leading circuit diagram design and simulation program for pneumatics, hydraulics and now also for electrical engineering. It provides teachers with a wealth of text, images, and videos for multimedia-based lesson planning.
- FluidLab: Functional testing and optimization is facilitated by the acquisition, display and documentation of analogue measured values in hydraulic and pneumatic equipment.
Learning success is based on many factors such as the interactivity of teaching, interdisciplinary collaboration, the combination of theoretical knowledge and practical experience, and access to real-world learning environments.

The holistic learning solutions from Festo Didactic consider these factors and are developed by experts from various fields: didactics, staff planning and development, engineering, industry and technology, governments and associations.
Competencies: Understanding and acting

By competence, Festo understands vocational skills. It is achieved through the appropriation of various types of knowledge. Festo employs these types of knowledge in the development of learning environments:

- **Procedural knowledge** is acquired through practical actions and is therefore always related to particular cases (casuistic). For example, motor skills as well as knowledge of rules, procedures and workflows are part of procedural knowledge.

- **Declarative knowledge** includes the theoretical background and the subject systematics of an area of expertise. Declarative knowledge makes it possible to question and optimize your own actions as well as to search systematically for opportunities for improvement. It is taught in systematizing learning phases, for example, through lectures, briefings or even self-learning phases.

Solutions for competence building

Learning solutions from Festo Didactic are always based on a number of related competencies to be achieved. These can be derived from respective professional areas of activity.

Educational institutions usually work with defined curricula and implicit competencies, for which Festo provides corresponding ready-to-use learning environments. For companies or training centers in global industrial regions, however, Festo also often analyzes competence requirements and defines corresponding programs for competence building. These programs include training and on-site consulting as well as developing and equipping training centers.

Didactics: Learning units from theory and actual practice

Competence building is most effectively achieved by alternating between practical, casuistic and theoretical, systematizing learning phases. The phases build upon one another as well as motivate and justify each other. Practical activities with a learning system make theoretically learned knowledge understandable in the same way that practical exercises also justify learning new theoretical content. The media and learning systems from Festo Didactic are structured in such a way that a learner can acquire, apply, review and reflect on knowledge according to this principle at his own speed.

Media didactics:

The intuitive combination of different information formats, media and learning systems is important for learning success. Learning media such as theory and task work, simulation media, electronic learning programs, and especially the training equipment are designed so that the information received is easy to understand and practical activities are realistic, efficient and above all can be practiced in the field.

The learning systems from Festo are designed so that processes are structured in their sequence and logic in the same way as real processes in technical and industrial environments. The sub-areas of the learning systems are designed reduced in terms of their educational function, i.e., only one process, method or technology is taught in each sub-area. Only industrial components are used in learning systems from Festo to map environments as realistically as possible.
The ever-advancing digitalization of learning environments also increases the efficiency of learning further. Digital simulations of energy as well as material and information flows, which Festo Didactic has been using for many years (for example, in learning solutions for control and process engineering such as FluidSIM®), enable fast and practical orientation and training in the subject areas. Designing and performing processes can be easily learned digitally in many varieties and applied directly to real situations.

An important development in the digitalization of learning environments is the ability to integrate a wide variety of media and data formats. A browser or system-based learning platform with open interfaces enables the respectively optimal media mix for each learning situation and also control of instruction via learning management applications. Depending on the learning needs and preferences for learning formats, learners can put together their lessons themselves and network with other students and instructors. The concept of "Connected Learning" (page to the right) is such a learning environment.

Knowledge sharing and collaboration on online platforms are also becoming increasingly important for learning. Festo Didactic provides the connected course and software via browser-based platforms to increasingly more learning systems, which offer community features at the same time where teachers can exchange ideas and inspire each other. An example of this is the "CP Community", which is available to customers of the cyber-physical learning and research platform "CP Factory" as an international collaboration platform (cf. "Communities" in the next chapter).

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Methods such as face-to-face, hands-on and self-guided learning are all linked through Connected Learning. The direct interaction between software and hardware adds a new dimension to learning, erasing the boundary between theory and practice.

The interactive multimedia learning companion Tec2Screen® is an excellent example of how the Connected Learning concept can be realized within technical learning labs. It connects digital learning material from all technical fields with the hardware components of learning systems. The learning companion consists of a combination of base unit and iPad, connecting modules and multimedia courses, which are accessible via the Tec2Screen® application.

The interactive learning content is displayed on the screen, and control commands are transmitted via lines and cable to the learning devices. As a result, the learner can directly track which monitoring and control commands act at which spot in a system and how different components and information are linked to each other.

Modular learning material from the fields of mechatronics, robotics, industrial communications and plant controlling, and can be directly connected to different learning environments designed by Festo Didactic.
Commitment to Education

Education is the basis for progress and a future to thrive for. Theoretical and practical skills in the use of new technologies and processes ensure that companies can continue to work innovatively and sustainably and enable people to participate from all cultural, political, social and economic aspects of a society.

Festo is strongly committed to the development of teaching and learning environments and the global transfer of knowledge as a leading global partner of companies and educational institutions and as a family-run company with an educational responsibility, i.e. “Corporate Educational Responsibility” (CER®).
Commitment to Education

04 → Development through education

New vocations: Aquatronics – water and wastewater management

By 2030, 47% of the world’s population is expected to live in regions without access to safe drinking water. 900 million people already face this situation today.

Ensuring a constant, sustainable supply of water is therefore a key issue around the world. Festo Didactic is committed to promoting the establishment of “aquatronics” as a vocational profile and to develop holistic learning solutions for the field of water management.

In the EDS, the complex system of water supply and wastewater treatment is structured into well-arranged, easily comprehensible process steps in an exemplary and practical fashion.

- Water treatment
- Water supply
- Wastewater transport
- Wastewater treatment
- Plant analysis, inspection, and process optimization
- Energy optimization in water supply and wastewater treatment systems

Technologies for knowledge transfer

Festo actively promotes the development of new technologies for knowledge transfer in collaboration with research institutions, educational institutions and industrial companies. An example of this is the assistance and knowledge system „APPsist“. Using available data from production processes to improve productivity will be supported in the future more and more by assistance and knowledge systems (AWS) that provide professionals with current specialized knowledge and instructions. APPsist supports professionals in production with instructions for process optimization and troubleshooting. The benefits of APPsist are in the automatic adjustment of applications to the support needs of professionals in the areas of operation of machinery and equipment, maintenance, repair and preventive maintenance. Thanks to process-related and automated knowledge transfer, professionals with different previous knowledge can be used more flexibly and comprehensively.

APPsist is connected via technical interfaces with individual machines, so that data from the production process can be transmitted using mobile technology. The providers of APPsist develop models together with the customer in each case for using production data. The data concern either error messages of machines, for which specific instructions are provided, or data that can be used for process optimization and making production more flexible.

Communities

The global trend toward networked learning and sharing of knowledge is spurring the dynamics of the cycle of education, innovation and economic development in regions and also the development of international technical and content standards in education.

Festo is promoting this process actively with the provision of digital technologies and online communities.

CP Community: The „Cyber-Physical Community“ is a part of the holistic learning offering on the topic of „Qualification for Industry 4.0“. Customers of the learning environments can download documentation and teaching materials for teaching from this platform and interact with other teachers and researchers concerning developments in the topic.

T.EACH: In the future, the knowledge and exchange platform „T.EACH“ will provide teaching materials in all technology fields such as electrical engineering, robotics and automation worldwide in different languages free of charge. Teachers and trainers can download the materials for their lessons to exchange ideas with other teachers and also upload materials themselves and sell them via a digital currency.

In the EDS, the complex system of water supply and wastewater treatment is structured into well-arranged, easily comprehensible process steps in an exemplary and practical fashion.
Employee commitment

In the context of contest and events, Festo contributes actively to inspiring young people for the topics mathematics, informatics, science and technology as well as making research of technical applications more tangible for them. For example, these include the RoboCup, the First Lego League, the WorldSkills and projects of the Bionic Learning Network. Festo provides technologies and materials there, with which youth people, trainees and students can experiment, research and train in the MINT subjects and compete with others.

The goal of the MINT project is to give students the chance to apply knowledge in actual practice and provide them with a perspective of future options in choosing a career. Technology areas in which Festo is active include electrical engineering, water management, renewable energy and bionics, for example. Experts from Festo are available for advice in the projects, who provide the participants with orientation, impart knowledge and answer questions as needed.

Bionic Learning Network

In the Bionic Learning Network of Festo, for example, solutions for automation tasks such as gripping, moving and positioning of goods or controlling and regulating processes are derived directly from nature. A team of engineers and designers, biologists and students from Festo has been working for many years in collaboration with renowned universities, institutes and development companies of very varied technologies.

The Future Concepts of the Bionic Learning Network serve as development platforms that combine different technologies and components: from manufacturing concepts to employed series products and all the way to software as well as automatic control engineering.

Thanks to continuous optimization of individual technologies, Festo obtains multifaceted insights and approaches to develop and improve new products and applications together with customers and partners. The expertise gained from this makes Festo the number one partner of its OEM customers in very varied industries and with differing requirements.

With the right components and solutions, services and expertise, Festo supports the product development of its customers from the start and assists them from market analysis for functional simulation to prototyping and all the way to efficient and productive serial production.

MINT – Mathematics, Informatics, Science and Technology

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Commitment to Education

The WorldSkills Competitions have for many years been the leading platform for international benchmarking in education. Festo Didactic is a WorldSkills Global Industry Partner. We support the competitions as an employer, as a training company, as an equipment and solution provider in the field of technical education, and as a promoter of the dual system for vocational training.

What motivates us to be consistently a leader in the field of technical education, to push forward research and learning, and to generate fresh impetus stems from a variety of sources: from our flexible approach to work in teams, from learning together with other disciplines and ways of thinking, from continuous and persistent research into technologies and from our intuitive, forward-looking orientation in the development of products.

And it is precisely those qualities that young people need in competitive markets: they must work consistently and flexibly, often under pressure, they must both complement and communicate with their partners, they must have a good command of technology and its multiplicity of details, and be intuitive and curious when faced with apparently irresolvable problems.

Our aim is to support and assist these people in universities, schools and industries with optimal products and services. Our activities are oriented towards their tasks and what they want to achieve. This is where we aim to excel and help to communicate the competencies that are required by industry and enterprise – the skills that they need to ensure their own growth and their training, as well as to contribute to the economic progress of their country.