Festo Industry 4.0 Certification Program

Building Careers for Industry

FESTO

Lifelong learning is an essential part of what makes human existence meaningful.

Dr. Wilfried Stoll

Festo Industry 4.0 Certification Program (FI⁴·⁰CP)

It all started with a lecture on pneumatics by Dr. h.c. Kurt Stoll. Over the past six decades, Festo Didactic's growth has made it the world's largest provider of technical education. Our long path led from the first seminars in the early 1960s to Festo Didactic's current position as a comprehensive educational provider, with technical education services ranging from training and consulting to highly complex "learning factories" to Industry Certification Program bridging the gap between industry and Education.

Festo Didactic started developing Industrial Training Systems in 1965 to address the needs of Festo staff. This expanded to training our customers to utilize the latest technology to increase productivity. As industrial technology advances, we continue to develop new engineering and technology solutions. This creates the need to verify skills development for the people who operate and maintain this technology – **Festo Industry 4.0 Certification Program** (FI⁴·⁰CP).

Technology Education

Automation / Mechatronics

Advanced Manufacturing

Industry 4.0

1965
Technology Education

2004
Advanced Manufacturing

2006
Bionic Network

2007
Industry 4.0:
1st Generation

2014
LabVolt Acquisition

2016
Mechatronics:
4th Generation

2018

1988
Mechatronics:
1st Generation

FACT – Festo Authorized and Certified Training Centers

2015
Industry 4.0:
2nd Generation

FI⁴·⁰CP

Maximizing learning success and productivity
Theoretical knowledge connected with practical experience

Building Expertise in Industry 4.0 Technologies

4.0

Level 3
Industry 4.0
Dual Associate Degrees
or Bachelor of Science

HMI · MES Operator
Advanced Product ID
Advanced PLC
Smart Maintenance
Advanced Robotics
Cyber-Security

Industry 4.0 Operator/
Technician, Mechatronics
Engineer

Potential Salary
$70,000 – $90,000/Yr

Level 2
Advanced Mechatronics
Associate Degree
+ Certificates

Applied PLC · Product ID Fundamentals
Applied Industry 4.0 · Applied Robotics
Maintenance Strategies
Applied Fluid Power

Mechatronics/Automation
Technician, Applications
Engineer

Potential Salary
$67,000/Yr

Level 1
Fundamentals
Certificate(s)

Fluid Power Fundamentals · **Electricity**
Mechanical Systems
PLC Fundamentals
Industry 4.0 Fundamentals · Robotics Fundamentals

Electromechanical Technician,
Production Technician,
Industrial Maintenance
Technician

Potential Salary
$40,000/Yr

Reshaping Manufacturing

The demand for highly-skilled, industrial problem-solvers continues to increase but there aren't enough qualified employees with the high-tech, design engineering and critical thinking skills needed to fill advanced manufacturing positions. Employees must adapt to the continuous technological changes. This requires a high level of transformation.

From industry – for industry

As a part of the Festo Group, Festo Didactic develops education and training solutions within the context of international research, educational institutions, and 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.

FI⁴·⁰CP Approach

At Festo Didactic, our mission is to provide industry and education partners with the technology, design, and engineering support needed to develop the workforce of tomorrow. FI⁴·⁰CP is a comprehensive certification program developed by industry experts and educators that ensures students have qualifying skills upon completion.
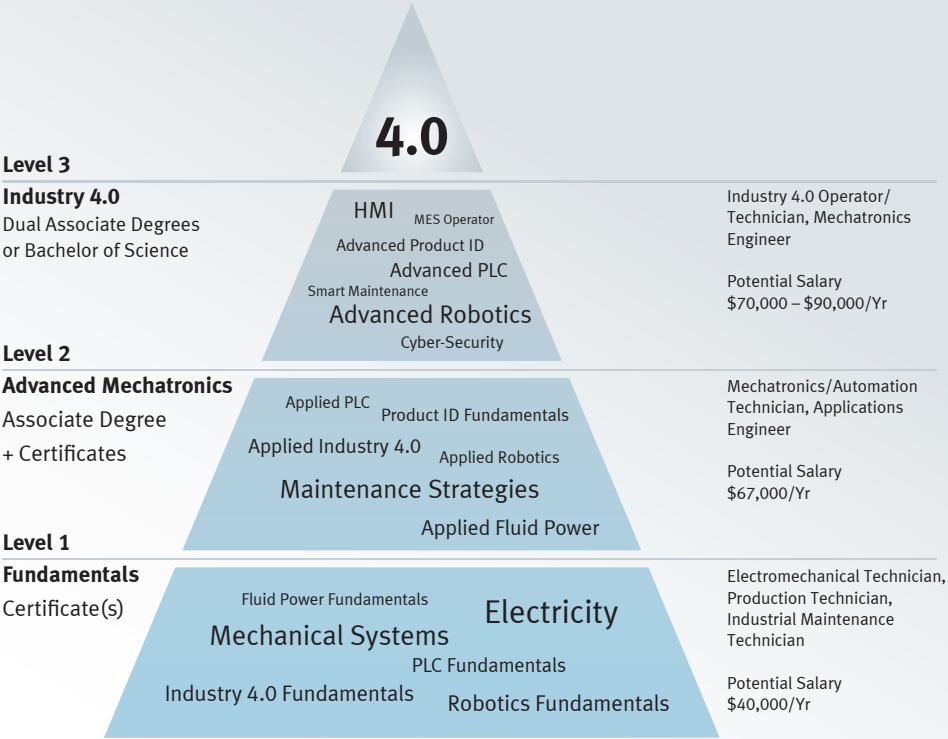
Holistic Certification Programs

FI⁴·⁰CP is easily integrated with existing certificate, Associate, and Bachelor degree programs, and offers three levels of certification. At Festo Didactic, we partner with NC3 – the trusted certification accrediting body in the industry – to ensure students are well-trained and ready for technical careers. We do this by deploying the industry's best trainers, designing a rigorous curriculum, and providing access to simulated smart factory equipment and learning systems. All FI⁴·⁰CP certified instructors go through NC3's Train-the-Trainer program and achieve an instructor certification that qualifies them to provide training to students (and other Educators) on how to operate and maintain sophisticated Industry 4.0 (I4.0) machinery. With FI⁴·⁰CP, colleges and universities can feel confident they're providing students the best possible opportunity for career advancement. Through the FI⁴·⁰CP program, students can horizontally or vertically stack certification levels. Horizontal stacking allows students to train across a variety of topics, for a well-rounded I4.0 education. Vertical stacking provides a more concentrated focus on a specialized topic area, moving through all three levels to complete individual certificates.

Certification Process
Following your path to success
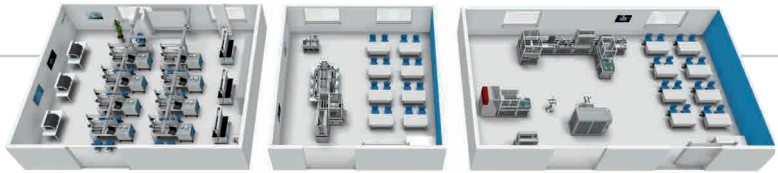
FI⁴·⁰CP
CERTIFIED

Creating partnerships with education

To ensure a world-class technical industry standard, Festo Didactic is cooperating with qualified colleges and universities in North America to offer Industrial certification to students who are educated by certified teachers working for the partner Institution. Along with I4.0 technical content, FI⁴·⁰CP focuses on providing a wide range of skills including critical thinking and problem solving. Festo Didactic provides turnkey solutions with courseware, equipment, training and exams around I4.0.

Partnerships with educational institutions are based on cooperation through beneficial activities in program development, research and teaching. Classrooms will be equipped with FI⁴·⁰CP hardware and have certified instructor(s) through NC3 Train-the-Trainer courses. The certification will supply the hands-on experience that industry is looking for.
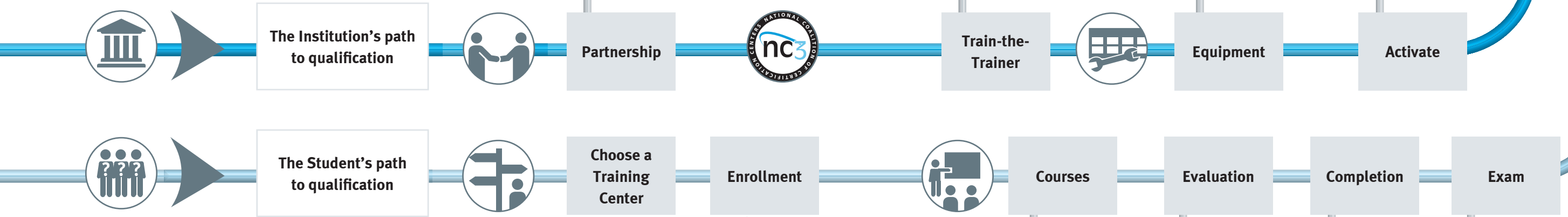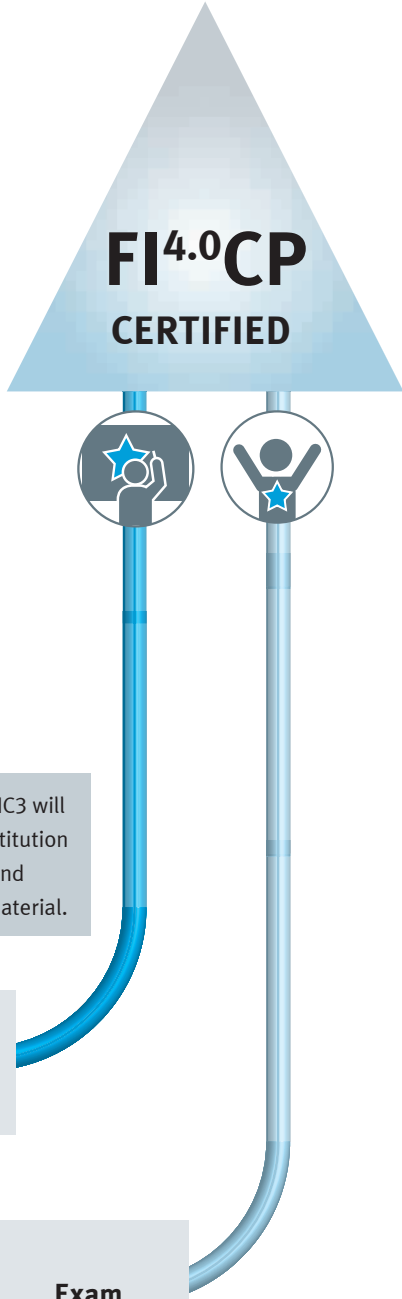
Benefits
– An Industry driven certification based on the needs of your students and the industries you serve.
– Additional verification that your students have the skills needed to meet the demands of your industries.
– Prestige to recruit students and industries to your institution.

Turnkey solutions
– Professional labs designed to your needs
– Versatility allows for a wide range of different subjects
– Expansion of learning space possible at any time
– Quick conversion times between various learning scenarios permit maximum flexibility and efficient utilization of classrooms

FI⁴·⁰CP easily integrates with existing programs.

Instructor(s) must attend Train-the-Trainer Courses. Instructor Certification is valid for 3 years.

Institutions must have the proper equipment needed to teach the course(s).

Once complete, NC3 will "activate" the Institution to offer courses and grant access to material.

The Institution's path to qualification → Partnership → nc3 → Train-the-Trainer → Equipment → Activate

The Student's path to qualification → Choose a Training Center → Enrollment → Courses → Evaluation → Completion → Exam

Increasing student employability

The demand for qualified and competent personnel is increasing. FI⁴·⁰CP aims to educate students from colleges and universities, offering a world-class industry certification for I4.0. The focus of FI⁴·⁰CP is to provide specialized technical and I4.0 curriculum with hands-on training and information students need to become industry experts – learning as the technology evolves, with the flexibility to shape and mold a career path with endless possibilities.

Benefits
– Allows students to transition into a variety of production, technician, and engineering jobs in high-tech and advanced manufacturing industries.
– Provide students with a clear advantage over their competition in the job market.
– Integrates into existing technical programs and is completed in parallel to students' studies.

Courses and labs are led by FI⁴·⁰CP certified instructors.

Knowledge checks are performed throughout the course.

Lab completion is verified by instructor.

At completion, end of course exam.

Hands-on learning helps students learn quickly and effectively

Level One: Fundamentals
Establishing foundational skills

At FI⁴·⁰CP level 1, certified students will be well-rounded machine operators/technicians, with responsibility for efficient operation of the equipment. They will ensure that the system is running at maximum capacity with an understanding of the role of each component and device. They can identify malfunctions and make minor repairs.
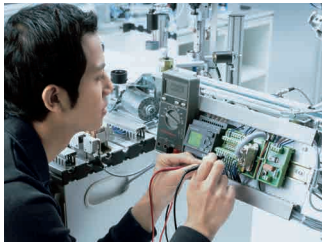
Electricity Fundamentals
- Electricity AC
- Electricity DC

Fluid Power Fundamentals
- Basic Hydraulics
- Basic Pneumatics

Mechanical Systems
- Mechanical Drive Systems
- Components & Calculations
- Belts, Chains, & Lubrication
- Maintenance & Installation of Components

PLC Fundamentals
- Sensors I
- PLC Technology I:
  Allen Bradley or Siemens

Robotics Fundamentals
- Introduction to Robotics

Industry 4.0 Fundamentals
- Introduction to Industry 4.0

Job Opportunities

- Electromechanical Technician
- Operator Technician
- Production Technician
- Industrial Maintenance Technician

Student can perform the following roles/tasks:

– Understand and implement safe operation and maintenance of machines and processes
– Troubleshoot, address common issues in electromechanical systems
– Perform routine maintenance activities
– Read and interpret schematics, blueprints, and technical drawings
– Operate and maintain fluid power systems

– Effectively work in a team environment and communicate clearly and efficiently with direct and indirect colleagues
– Perform basic robot programming and operation
– Identify and explain the components/functions of a PLC and perform basic PLC programming
– Describe the function of various sensors and select the correct sensors for different applications

– Understand and explain the basic concepts and terms of Industry 4.0 and how digitalization is impacting the industry, our daily lives, and cyber-security

Level Two: Advanced Mechatronics
Building technical competency

At FI⁴·⁰CP Level 2, certified students will be skilled technicians who are able to assess and analyze the system as a whole. They can manage, investigate, repair and troubleshoot I4.0 systems to maximize operation and process control. They understand how individual components interact with each other to make the whole system run efficiently.

Product ID Fundamentals
- Vision Technology I
- RFID I
- Bar Coding I

Applied Fluid Power
- Maintenance & Troubleshooting
- Energy Efficiency
- Vacuum Technology

Applied Mechanical Systems
- Gear Drives
- Bearings & Gaskets/Seals
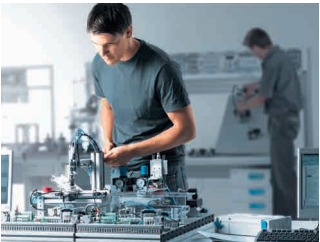- Clutches and Brakes
- Ball Screws and Linear Bearings

Applied PLC
- Sensors II
- PLC Technology II:
  Allen Bradley or Siemens
- Basic Networking
- CoDeSys

Applied Robotics
- Programming & Editing
- Maintenance & PM

Applied Industry 4.0
- Introduction to MES
- Introduction to HMI
- Introduction to Data Safety
- Introduction to 3D Modeling

Job Opportunities

- Mechatronics Technician
- Automation Technician
- Robotics Technician
- PLC Technician
- Applications Engineer

Student can perform the following roles/tasks:

– Set up, commission and systematically troubleshoot complex electro-pneumatic systems
– Calculate cost to generate and use compressed air and identify system inefficiencies for correction
– Understand, describe, implement, and maintain vacuum systems
– Understand and Utilize CoDeSys for programming and troubleshooting

– Modify a current PLC program and integrate HMI (Human-Machine Interface) Applications
– Describe and explain the function of RFID, Barcodes/QR Codes, and Vision Systems
– Program and edit complex robot applications, incorporating sensors and other automated elements
– Understand and incorporate critical safety measures, such as machine guarding, for robotic systems

– Understand and explain basic networking fundamentals
– Define and configure Manufacturing Execution System (MES) and related functionality
– Utilize web services/email push delivery and explain the importance of data security
– Explain how 3D Modeling of systems impacts production systems

Level Three: Industry 4.0
Achieving career expertise

At FI$^{4.0}$CP level 3, certified students will become skilled designers and engineers of complex I4.0 Systems. Their responsibilities will include applying systems engineering practices, such as engineering, process management, and quality assurance management, in a project with the goal to implement, maintain, or improve I4.0 systems.
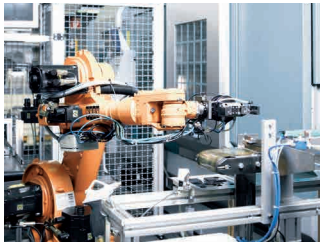

Advanced Product ID
• Vision Technology II
• Near Field Communications
• RFID II
• Bar Coding II
• Potential & Impact

HMI
• Manufacturing Processes
• Programming
• Creating Visual Awareness
• Recipe Creation
• Data Acquisition

Advanced Robotics
• Collaborative Robots
• Augmented Reality
• IRA Safety Standards
• Integration of PLCs w/Robotics
• Virtual Commission

Advanced PLC
• Sensors III
• OPCUA w/ MES & PLC
• I/O Condition Monitoring
• Advanced Networking
  & Connectivity

Smart Maintenance
• Predictive Maintenance
• Data Analysis
• LEAN & Visual Awareness
• Top Floor – Shop Floor Communication

Cyber-Security
• Data Corruption: Understanding the Risks & Consequences
• Preventing Cyber-Attacks
• Managing Consequences: Data Analysis & Quality Control

Job Opportunities

• Industry 4.0 Operator/ Technician
• Mechatronics Engineer
• Robotics Specialist
• PLC/Controls Specialist

Student can perform the following roles/tasks:

– Ability to plan working sequences using the RFID technology and logical connected sequences
– Demonstrate working knowledge about production planning and control, and the functions and responsibilities of ERP & MES
– Ability to operate the MES4 of CP Lab/CP Factory
– Understand the connection of Industry 4.0 and Lean Management

– Ability to create new products and working plans for the CP Lab/CP Factory using the MES4
– Analyze production processes using value stream mapping
– Utilize analysis tools of the MES4 and interpret gained data
– Define network topologies and use code methods
– Define MAC and IP addresses and manage Ethernet-IP communication

– Determine data security risks and apply safety measures
– Ability to analyze PLC systems and to structure them
– Plan and develop modular program structures
– Develop simple, library oriented modules for TIA portal
– Develop maintenance strategies based on Key Performance Indicator calculations
– Perform target-oriented elimination of machine faults and identify root causes

– Practice mobile maintenance and augmented reality
– Ability to test the function of Industrial Robots
– Ability to use the tool changing system in Robotics
– Integration and data exchange with Industrial Robotic applications
– Analyze boundary conditions and plan for usage of a HMI
– Ability to design, simulate, and test an HMI according to defined specifications

– Define service and inspection periods for a high machine availability with condition monitoring

Industry Applications

• Manufacturing
• Automotive
• Automation
• Food and Beverage
• Consumer Goods
• Distribution and Logistics
• Robotics

Festo Didactic is a proud partner of the National Coalition
of Certification Centers (NC3).