



Lucas-Nuelle at a glance



SKILLS

TECHNOLOGY

ENGINEERING

**REAL
EXPERIENCE
LEARNING**



Lucas-Nuelle, has developed training systems that stay up to date with modern technology by collaborating with industry and educational experts. Our strengths lie in our skilled training methods and technical implementation by means of Blended Learning, which benefits both the instructor and learner. This approach has yielded successful learning outcomes for future skilled workers.

Lucas-Nuelle is a market leader in technical training systems and has been for many years, having completed successful projects in over 100 countries.

LN[®]

LUCAS-NUELLE



High Quality
made for
America

Our Product Areas



Electrical Installations and Industrial Maintenance

PAGE 08 - 11



Electrical Power Engineering
Smart Grids / Micro Grids

PAGE 12 - 13



Drive Technology, Transformers
Electric Machines & Power Electronics

PAGE 14



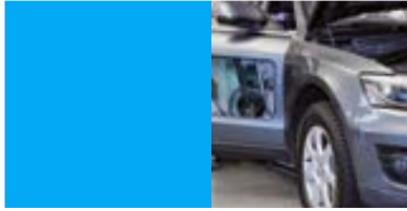
Process Control

PAGE 15



Automation Technology
Smart Factory, Robotics, Industry 4.0

PAGE 16 - 17



Automotive Technology
Diagnosis, Hybrid and Electric Vehicles

PAGE 18 - 19



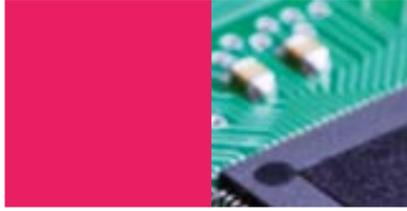
Fluid Power
Pneumatics / Hydraulics

PAGE 20



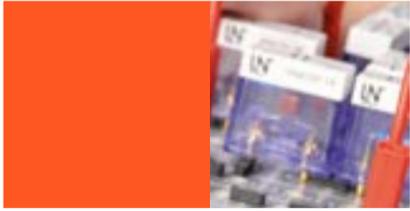
Communication Technology
Cyber Security

PAGE 21



Microcomputers
Microcontrollers, IoT

PAGE 22



Basics of Electrical Engineering
EloTrain Plug-In System, UniTrain

PAGE 23 - 25



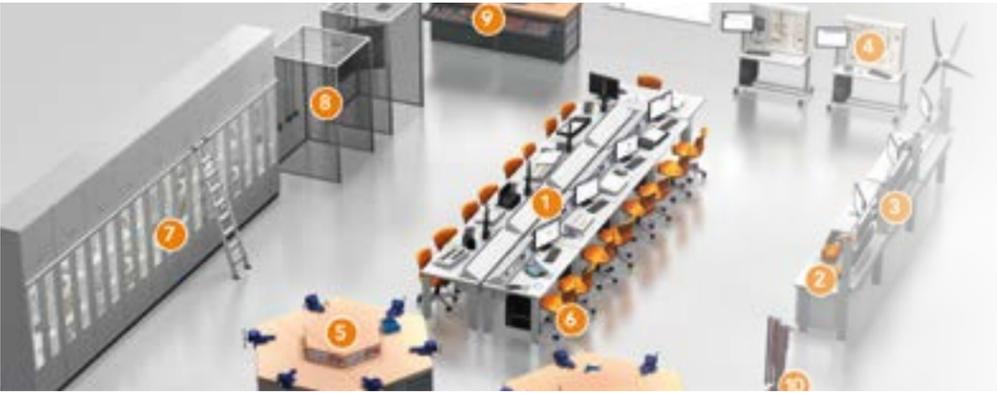
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ln.eu/us-yt

1 Individual Consulting

Project Planning
Curriculum Strategy



2 Facility Planning

3D Model

3 Installation



4 Training

Train the Trainer
Advanced Training
Technical Instruction

5 After-Sales Service



Complete laboratories for
a range of technical areas

More than just a training system

Workshop equipment
Custom-designed equipment
and infrastructure

Modular training systems
Individual test set-ups for a range
of technical areas

Learning factory 4.0
Training systems for the
smart factory

Student test and measuring stations
Multi-Signal working environment

UniTrain experimental laboratories
Hands-on learning approach

Real-life application
Authentic training in a safe
environment

UniTrain System

The UniTrain system is a versatile multimedia blended-learning platform designed for computer-based desktop training and hands on experimentation. It is used in conjunction with different types of basic and advanced technologies, engineering, and automotive technology. A comprehensive library of more than 125 LabSoft multimedia courses is available that include hardware experiment cards, featuring Virtual Instruments (VIs) making it ideal for self-paced learning. All LabSoft multimedia courses are subscription-free and can be integrated into any LMS system. The UniTrain is usable anywhere at any time.



Panel Training Systems

The Panel system represents a modular training platform centered around hands-on experiments using authentic industrial equipment. It delivers a comprehensive understanding of technology and its professional applications through parallel or rotational group training using real-world industrial components. This system is well-suited for various technology and engineering fields, including automotive technology. Each panel training module is complemented by a computer-based Interactive Lab Assistant (ILA) course. The Panel system allows for easy arrangement onto experimental frames of 1, 2, or 3 levels, all without the need for tools. This design, coupled with its modularity, enables the creation of different experiments using the same units, eliminating any additional costs.



CarTrain | TruckTrain System

The CarTrain/TruckTrain system is a compact and durable training solution encased in a robust metal housing. It provides completely safe and repeatable hands-on experiments in both fundamental and advanced automotive and truck technologies. Each CarTrain/TruckTrain training system is supported by Interactive Lab Assistant (ILA) courses. Thanks to its sturdy construction and stability, this system is well-suited not only for classroom use but also ideally fits into workshop settings. It comes equipped with all necessary operational components, measuring instruments and fault switches, pre-installed. These versatile CarTrain/TruckTrain systems can be conveniently placed on standard tables or on specially designed mobile trolleys.



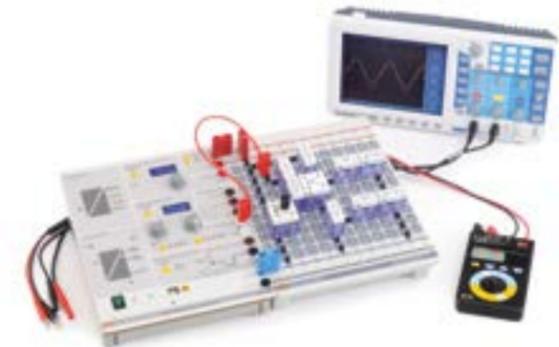
MobileTrain System

The MobileTrain system is an ideal portable training solution equipped within a rugged plastic case including a handle and wheels for easy transportation. The case's lid is detachable and gives plenty of extra room for storing measuring instruments and accessories. Each MobileTrain system comes with Interactive Lab Assistant (ILA) courses. It is suitable for different areas of training, and its flexibility and mobility makes it ideal for location-independent use. It can be used not only in classrooms, but also in workshops, at home or any other location.



EloTrain System

The EloTrain plug-in system offers a full variety of components used for conducting experiments covering electrical fundamentals, electronics, digital technology, and automotive topics. Each topic is complemented by a manual. These versatile 2- or 4-mm transparent plug-in components with schematic symbols can be configured in any arrangement on an EloTrain plug-in board. In addition, every EloTrain system can be used with an existing textbook to illustrate circuit setup and practical application. It's a preferred choice for traditional programs focused on teaching components and circuits.



Mechatronics System

The Mechatronics systems are offered in two configurations: table-top Industrial Mechatronics Systems (IMS) and floor-standing Industrial Mechatronics Units (IMU). These systems are customizable, expandable and are used all together to demonstrate Industry 4.0 and Smart Factories. They include features like Cyber Physical Systems (CPS) with PLCs, an ERP-Lab with a Webshop, MES and SCADA functions, Predictive Maintenance and even Cyber Security. Every workstation comes with its own Interactive Lab Assistant (ILA) courses to help users understand how individual station work together in a modern factory placed on standard tables or on specially designed mobile trolleys.





Electrical Installations and Industrial Maintenance

Electrical Installations and Industrial Maintenance



Electric Vehicle Charging Station Trainer - Wallbox

Whether at home, at work, in retail stores, in underground parking facilities or in the hospitality industry, wallboxes are a safe and reliable EV recharging solution suitable for every application case. The electrical safety of the charging infrastructure must be certified by the operator at regular intervals. This equipment is used to train personnel on how to inspect such hardwired charging infrastructure along with the portable charging cable.

Topics:

- Adaptation of charging infrastructure to the upstream installation
- Electrical hazard
- Protective measures against electric shock
- EV charging methods
- Inspection and testing of electrical charging stations
- Setting up communication with the wallbox
- Troubleshooting wallboxes



Test and measuring equipment accessories



Rolling case

AC/DC and Three-Phase Electrical Systems

Fundamentals of AC/DC and Three-Phase electrical systems used for power, control and automation in industrial, commercial, agricultural, and residential applications.

Topics:

- Electrical circuits in direct current (DC), alternating current (AC) and three-phase (3P)
- Ohm's law
- Kirchhoff's voltage and current laws
- Using measuring instruments (voltmeters, ammeters, ohmmeters, oscilloscope, etc.)
- Resistors, inductors, capacitors
- Series and parallel circuits
- Circuit Analysis
- Circuit Protection Devices
- Electromagnetism
- Electrical distribution
- Voltage Dividers
- Power sources
- Relays, switches and contactors
- Transformer Sizing and Types
- Principles of Electric Motors
- Troubleshooting of electrical circuits (accessible via lockable switch box)



Extendable handle





Electrical Installations and Industrial Maintenance

Electrical Installations and Industrial Maintenance



Professional Training of Lineman The Transformer Trainer

In power engineering transformers are used to connect different voltage levels of the power grid. At utility poles the electricity of the regional distribution network with the medium voltage of 4.6 to 33 kV is transformed for the supply of the low-voltage end customers to 120 V/240 V or 208 V. Working at such high voltages is life-threatening. Safe handling of the electrical equipment must be learned in order to avoid endangering yourself and others. But how are transformers connected? What types of connections are there and how are they wired? What do they do? And what is important during a test? With the "Transformer Trainer" training system, you can train know-how and the ability to act on these questions.

Topics:

- Set-up and configuration of transformers
- Set-up and configuration of single-phase, split-phase three-wire and three-phase transformers
- Wiring the four common distribution transformer banks: Wye-Wye, Wye Delta, Delta-Wye, and Delta-Delta
- Grounded (earth) the secondary delta for floating deltas (old 480-volt service), grounded corner deltas, and four-wire deltas (wild triangles) to produce both 240 V three-phase and 120/240 single-phase service
- Measure and display each transformer output voltages under single phasing conditions on the primary



Predictive Maintenance and Condition Monitoring by means of vibration analysis 300W

Condition monitoring supplies information about various drive parameters in real time. This provides insight into the current condition of the drive or machine. Condition monitoring enables precise fault identification, preventive action, maintenance interval optimization and downtime reduction, and renders production operations more reliable. Predictive maintenance and condition monitoring by means of vibration analysis.

Topics:

- Recording of machine condition in real time using vibration analysis
- Recording of vibration data and analysis of frequency spectrum (FFT)
- Investigation of various fault patterns:
 - Analysis of alignment errors
 - Analysis of imbalance in the drive system
 - Analysis of bearing damage
 - Analysis of gearbox damage
- Classification of fault patterns and parameterization of warning and alarm levels in condition monitoring





Electrical Power Engineering

Renewable Energies



Smart Grids and Micro Grids

The significance of energy as a topic has grown immensely, and electrical energy is becoming increasingly important. As a result, there is a high demand for qualified technicians and engineers worldwide to implement the necessary developments. Our systems comprehensively cover the entire spectrum of energy topics, including controls for smart grids and microgrids.

Topics:

- Energy generators and consumption
- Energy transmission and distribution
- Protection for energy equipment and plants
- Energy management in smart grids and microgrids (SCADA)
- Cyber security

Wind, Photovoltaics Fuel Cells

The world is currently in the process of transitioning to renewable energies, with wind and photovoltaics playing a significant role in meeting energy demand. The technologies driving these developments are innovative, and our systems are designed to equip energy engineers and technicians with the necessary tools and knowledge to meet the new expectations placed on them.

Topics:

- Renewable energy generation
- Wind, photovoltaic and fuel cell technology
- Energy storage
- Single-phase and three-phase systems
- Integration of smart grids and microgrids





Drive Technology, Transformers

Process Control



Electric Machines and Power Electronics

Drive systems are a crucial element in many machines, and Drive Technology is intricately linked to other specialist fields, including the latest developments for Electric Vehicles, as well as other evolving technologies. As a result, technicians and engineers face new demands that cover various areas. Our training equipment comprehensively covers this topic, from the basics to modern application scenarios, ensuring learners acquire the necessary skills to meet these new demands.

Topics:

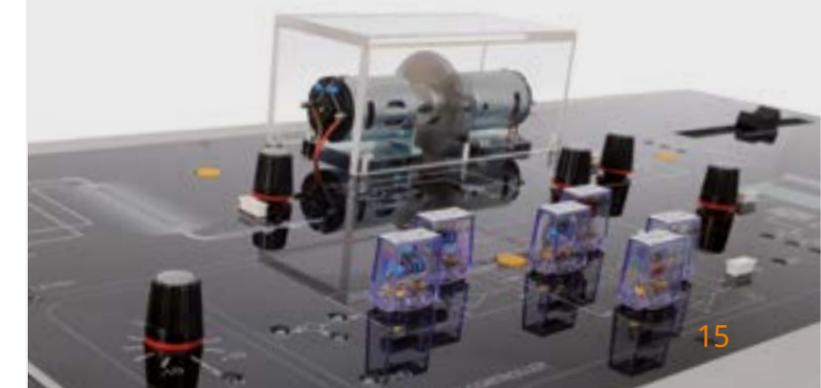
- Frequency controllers
- Single-phase and three-phase transformers
- Active load for machine testing
- Matlab Simulink: design a drive controller
- Complete laboratory solution for electrical machines

Measure, Compare and Control

In Industry 4.0 (smart factory), production is closely connected with the most up-to-date communications technology. It is based on monitoring the process status using sensors and the automatic control of process variables. Knowledge of sensor technology is important for all who come into contact with automation systems – including mechatronics technicians and engineers.

Topics:

- Sensor technology: measuring electrical and non-electrical parameters
- Modern servo technology
- Applied control technology
- Controller types (such as three-point or PID)
- Matlab Simulink: design and program control systems





Automation Technology

Smart Factory



Robotics, Bus Systems and Applied Automation

Automation technology is becoming increasingly important, driven by rapid changes in industrial process automation. The progress in drive technology and computer technology is closely linked to the advancement of automation technology. Instructors face a significant challenge in ensuring that students are up-to-date with industry developments.

Topics:

- Programmable Logic Control (PLC) technology
- System models & process simulators
- Safety engineering in automation technology
- Industrial process automation (IPA)
- Industrial robots
- Collaborative robots
- 3-Axis gantry robots

Industry 4.0

Industry 4.0 is notable for its flexibility and efficient use of resources. This encompasses adaptable production processes, the utilization of interconnected systems, and the consolidation of all information in a Cyber-Physical System (CPS). Smart Factories are supported by a Cloud-Based Enterprise Resource Planning (ERP) system. Our training systems cover all of these topics, providing a comprehensive "Learning Factory 4.0" solution from a single source.

Topics:

- Customer-specific production
- Production via the Internet (CPS)
- Unique ERP training software
- Cyber security
- Web shop: from order entry to shipping
- Augmented Reality
- Virtual Systems (digital twin)
- PC-based graphical 3D simulation





Automotive Technology



Hybrid and Electric Vehicles

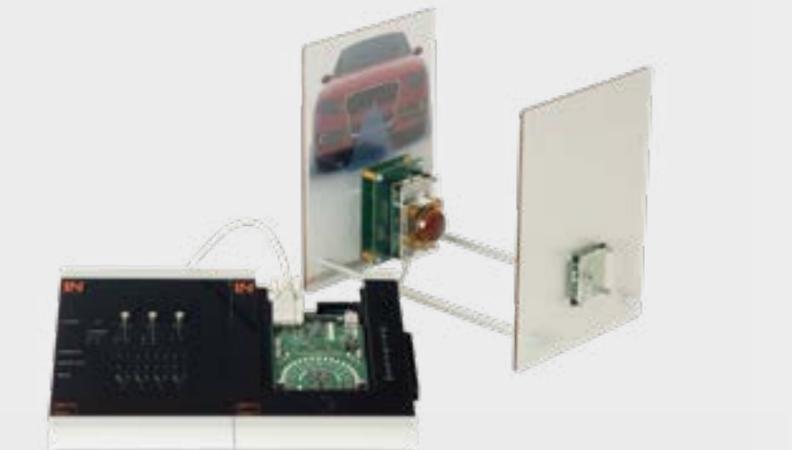


ASE L4 Qualification for ADAS

The Advanced Driver Assistance Systems (ADAS) Specialist Test, or ASE L4 certification, is aimed at technicians who possess the necessary skills to diagnose, repair, and calibrate advanced driver assistance systems in vehicles. LN is offering the world's first comprehensive hands-on training system solution for preparing students and technicians to successfully pass the ASE L4 certification and increase employability skills.

Topics:

- Insight into RADAR, LIDAR and front facing camera
- Using real sensors within the classroom
- Hands-on calibration
- Including ACC, Active Lane Assist, Park Assist, Emergency Brake Assist, CAN, Bus, Ethernet

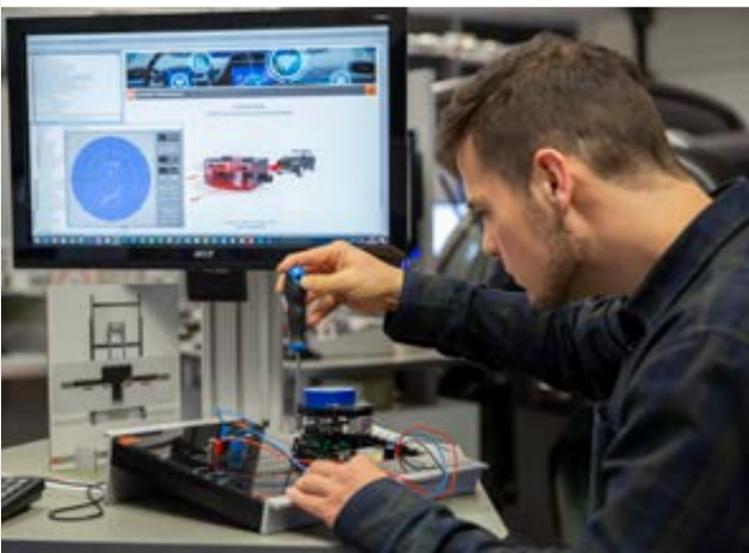


ASE L3 Qualification for EV/HEV

As the popularity of electric vehicles continues to increase, they are fueling innovation in the automotive industry. To train the next generation of qualified vehicle technicians, it is essential to teach them safe HV (high voltage) system handling. Our hands-on trainers for EVs are designed to use real PPE (Personal Protective Equipment) during real-world experiments related to HV vehicles. This approach ensures a comprehensive transition for technicians into working with these vehicles safely and effectively.

Topics:

- Real but student safe HV system
- All HV isolation procedures included
- Safe diagnosis with real HV faults
- Official SkillsUSA trainer for EV
- First Responder Training





Fluid Power

Microcomputers



Pneumatics/Hydraulics

The installation and maintenance of industrial manufacturing plants require the expertise of engineers and technicians with practical experience in operating and maintaining pneumatic and hydraulic components. To meet this demand, we have collaborated with Bosch Rexroth and Aventics to develop training systems that provide learners with a realistic working environment to enhance their hands-on experience and employability skills.

Topics:

- Pneumatics and electropneumatics
- Hydraulics and electrohydraulics
- Interactive electrical circuit diagrams
- Industrial applications
- Automation studio: professional software

Microcontrollers. FPGA Microprocessors.

Intelligent systems require microcomputers, which are no longer solely operated by programmers. Our UniTrain package solution provides a comprehensive teaching tool for various programming languages and hardware architectures, presented in a user-friendly and easy-to-understand format.

Topics:

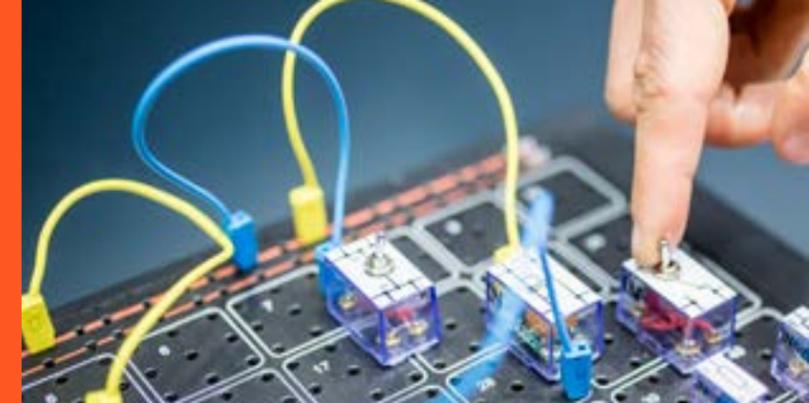
- Programming languages (including UML and VHDL)
- Hardware architecture from 8 bit to 32 bit
- Controlling cyber-physical systems (CPS)
- Programming the Internet of Things (IoT)
- Basics of computer technology





Communication Technology

The Basics of Electrical Engineering



With Cyber Security

The modern telecommunications industry forms the backbone of networks and digitalization. The importance of areas like cyber security and digital signal processing is rapidly on the rise. Our UniTrain delivery platform provides over 120+ virtual instruments designed for student performing experiments, with both wired and Wi-Fi connectivity options included.

Topics:

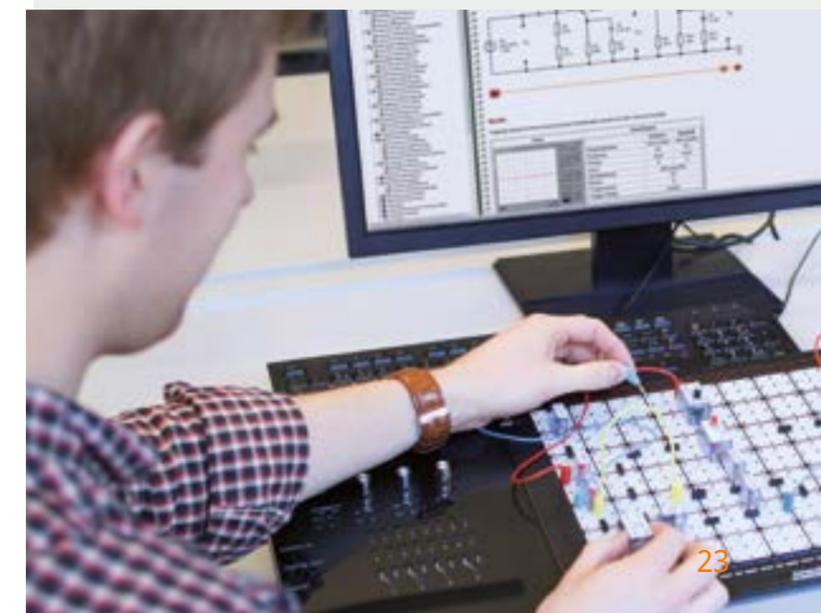
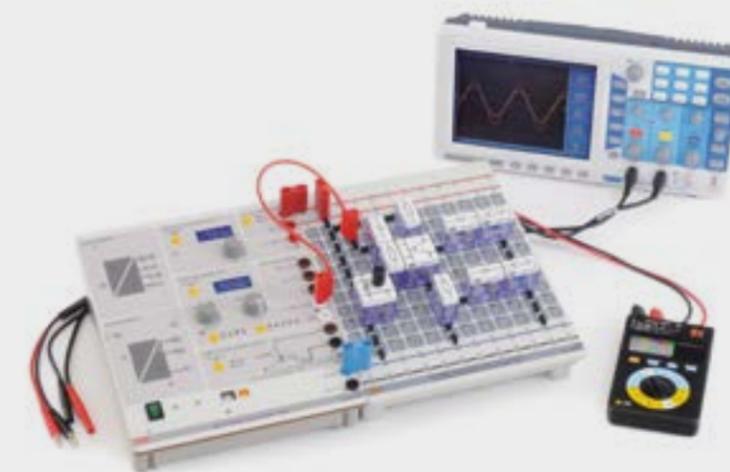
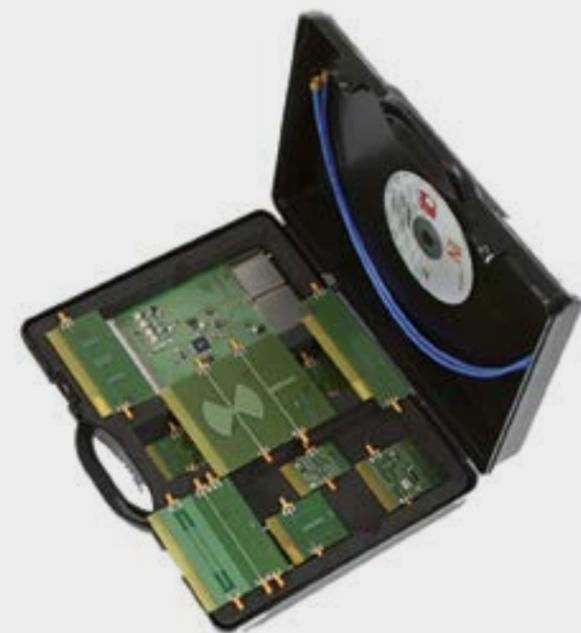
- Transmission and receiver technology
- Modulation and multiplexing
- Digital signal processing
- Network technology and cyber security
- Radar technology

The EloTrain Plug-in System

EloTrain offers a secure learning environment for students to experiment with the basic elements of electric circuit design, covering both fundamental topics of electrical engineering and theory. The system uses extra-low voltage, making it safe and ideal for beginners. Through experimental learning, students can bridge the gap between theory and practice, taking their first step towards acquiring competence.

Advantages:

- Competence gained through self-paced experimentation
- Student protection using extra-low voltage
- Proven plug-in systems for 2mm (UniTrain) and 4mm (multi-power supply)
- Basic experiments
- Reconfigurable system





UniTrain

LabSoft



Multimedia Desktop Lab

Through continuous development, the UniTrain delivery system has become the most widely used and versatile teaching system for prospective electrical engineers and technicians. It offers a complete laboratory with more than 120 measuring devices and sources in one unit. Available in multiple languages.

Advantages:

- Competence through experiment-based learning
- Flexible application in a wide range of technical areas
- Theoretical content with hands-on application
- Supports individual learning
- Safety through extra-low voltages



Interface with large experiment board



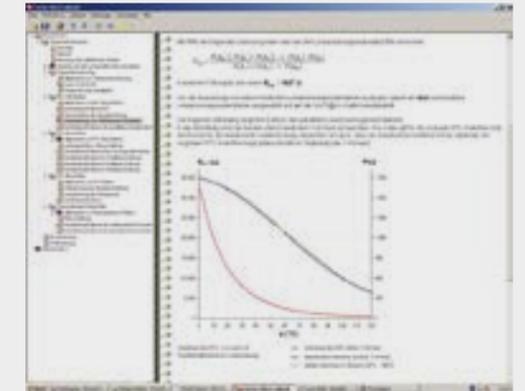
UniTrain Electric drives in cars, trucks and two-wheelers

Learning Environment and Classroom Manager

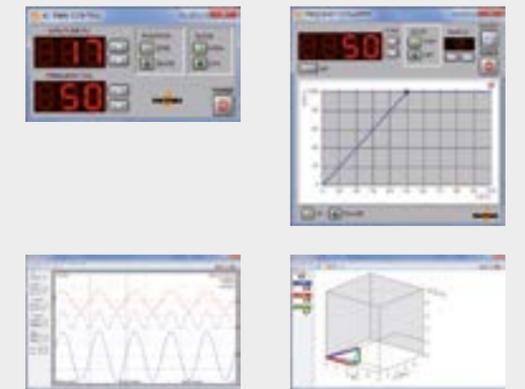
LabSoft offers a user-friendly learning environment with a simple interface menu navigation that enables learners to access learning content quickly. It also has the capability to support the control of Lucas-Nuelle hardware via its integrated virtual instrumentation. Additionally, the LabSoft Classroom Manager Software Suite is available, offering a powerful editing and lesson creation software to further personalize and enhance the learning experience.

Benefits of Training:

- Simple navigation to course content
- Over 100 different virtual instruments
- Results stored on user-by-user basis
- Installs locally, on a network or with an LMS
- Classroom Manager Software Suite



Virtual instruments



Classroom Manager Software Suite

- | | |
|---|--|
|  Manager – minimize administrative effort |  Questioner – create questions and measurement exercises |
|  Reporter – everything at a glance |  Test Creator – check knowledge and skills |
|  Editor – customize subject matter |  Control Center – share information to the group |



Benefits from Lucas-Nuelle

Benefits of Training:

- Blended e-learning and hands-on training provide a comprehensive knowledge transfer
- Training methods can be tailored to meet the preferences of the instructor/trainer using parallel and rotational approaches
- Highly flexible experiment set-ups can be achieved through unique integrated/independent modular designed trainers
- Classroom and laboratory facilities are available for training session

Software Benefits:

- Local or cloud-based education using our LabSoft suite software environment for all training systems
- Complete Virtual Instrumentation with curriculum integration available
- Full classroom progress transparency for educators and trainers using our management software tools
- Possible curriculum integration with popular SCORM 1.2 / 2004 4th edition, i.e. Canvas, Blackboard etc.

Hardware Benefits:

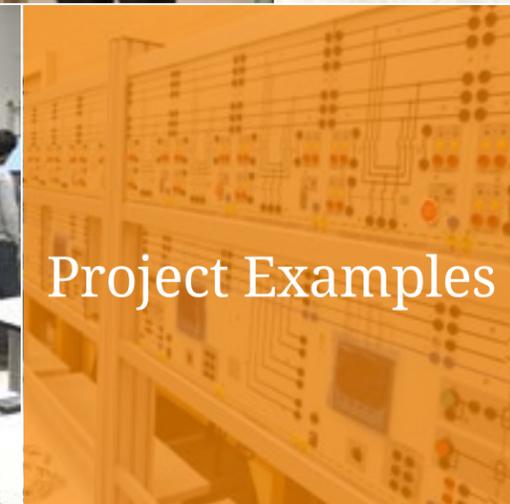
- Trainers feature state-of-the-art and current technology
- Trainers are engineered for durability and proven to be student-proofed
- Trainers meet safety standards according to IEC, DIN, UL, and CSA, ensuring instructional safety for both students and equipment
- Trainers are developed and engineered exclusively for comprehensive, tailor-made laboratory solutions

Service/Support Benefits:

- Over 50-years experience and expertise in more than 100 countries and 30 languages worldwide
- Cost-effective one-stop turn-key laboratory solutions
- Lifetime support offered through product specialists and engineers
- Extensive after-sales-service and support with local US presence (Williamsburg, VA)

Governmental/Industrial Benefits:

- Educational programs designed to support the latest Industrial technology trends and requirements
- Industrial trained technicians, engineers and skilled workforce that encourage, promote and support local industrial growth
- Complete program development process from consulting, curriculum implementation, facility planning, setup and training
- We offer various laboratory options that cater to budgetary limitations, availability of human resources, and constraints on educational time spent managing students. These options aim to improve the effectiveness of your teaching staff



Project Examples

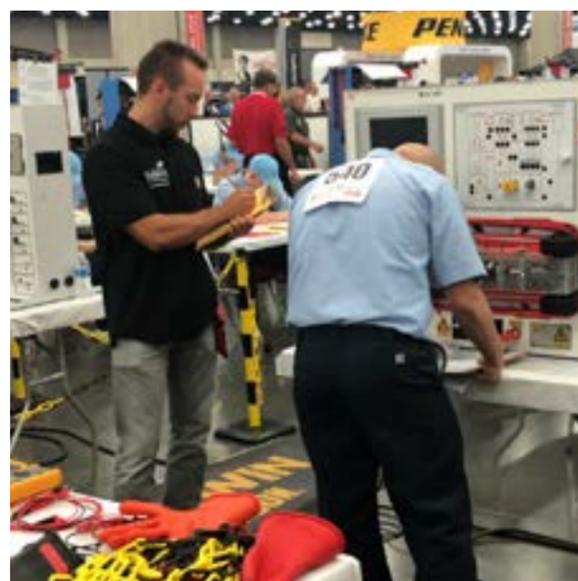
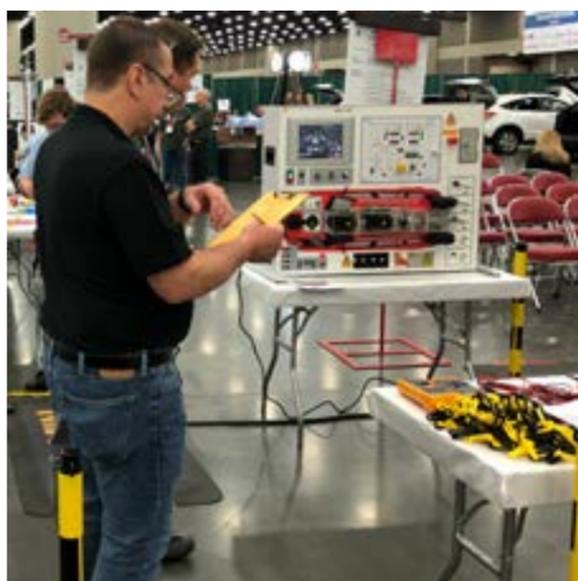


Technology from around the World, Service from around the Corner!

- After Sales Service through 3 Levels of Support
- Local Service and Expertise in Williamsburg Virginia
- Partnership with Local and International Training Experts

We guarantee Quality:

- 3500 individual products
- Lead-free production
- Lean and "green" production
- ISO 9001 certified
- Highly qualified work force
- UL & CSA compliant
- Total quality assurance



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REAL EXPERIENCE LEARNING



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