Engineering Education
Solutions Guide

2022-2023

TecSolutions

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Contact

TecSolutions exists to equip universities in Texas, Oklahoma, New Mexico, Colorado, Utah, Wyoming, Idaho and Montana with technology-enabled teaching solutions that empower individuals to create a better life for themselves and their families.

TecSolutions is one of three companies founded by Tim and Dede Brown in order to meet the growing need for teaching solutions. TecSolutions provides equipment for various engineering disciplines while both X-Cal and Tech-Labs provide technical training solutions. Over the last 40 years, these companies have developed into a full-service technical training systems and instructional software providers.

Schedule a vistit to our Solutions Center today!

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Solutions Center

Our Solutions Center is a 14,000 square foot commercial building that is divided into space for our offices, demonstration areas, and training rooms, as well as a 6,000 square foot warehouse.

Our new building provides many structural upgrades which allow us to showcase the latest equipment available in our hands-on demonstration areas. Additionally, we added state-of-the-art training rooms and a conference center.

Not only does the warehouse provide a demonstration area for our larger pieces of equipment, it allows us to keep an inventory of popular products, and spare parts to shorten the delivery cycle and minimize equipment downtime.

We would like to invite you to our new facility to give you a firsthand tour of our comprehensive solutions for Engineering, CTE, Robotics, Additive Manufacturing, Certifications, Industry 4.0, STEM, Medical Simulators and much more!

Mobile Solutions Center

Our Mobile Solutions Center is on the road to give customers a firsthand look at many of our solutions!

Contact us to schedule a hands-on demo of our solutions or to get added to our mailing list for up-coming events.

TecSolutions, Inc.
P.O. Box 218984
Houston, TX 77218

Ready to learn more? Contact your Regional Sales Manager!

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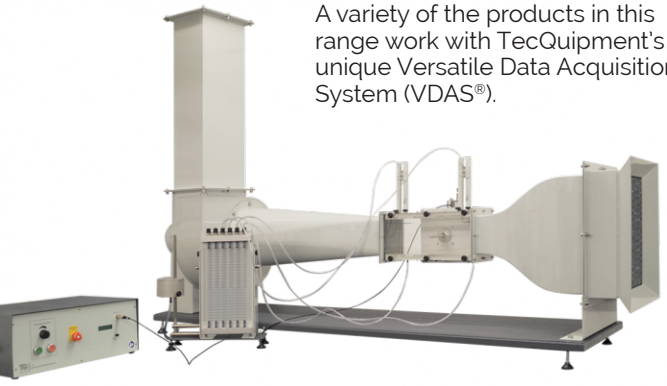
Aerodynamics

The aerodynamics range is used to teach a vast range of aerodynamic principles from fundamentals to advanced theories – with products to suit every space, budget, and complexity requirement. The wind tunnels span a variety of sizes and experimentation capabilities ranging from bench-top models for learning the basics to versions requiring large laboratories for a more detailed understanding of aerodynamics.

A variety of the products in this range work with TecQuipment's unique Versatile Data Acquisition System (VDAS®).



Principles of Aerodynamics

TecQuipment's subsonic wind tunnels teach students the basics of lift, drag and pitching moments, plus high-level topics such as boundary layer and pressure distribution around models. Students can also perform wake investigations.

Advanced Theory of Aerodynamics

TecQuipment's supersonic wind tunnels are for more advanced teaching with experiments that start with nozzle pressure distribution, on to analysis of Mach numbers, and the measurement and visualization of pressure and shock waves using Schlieren apparatus.

Alternative Energy

The Alternative Energy range offers teaching equipment for the core principles of solar and wind energy. Students can learn about the efficiencies and limitations of methods of harnessing and converting solar and wind energy for use in the real world.

Photovoltaic, Focusing and Flat Plate Energy Collection: Demonstrates three key methods used in harnessing solar energy.

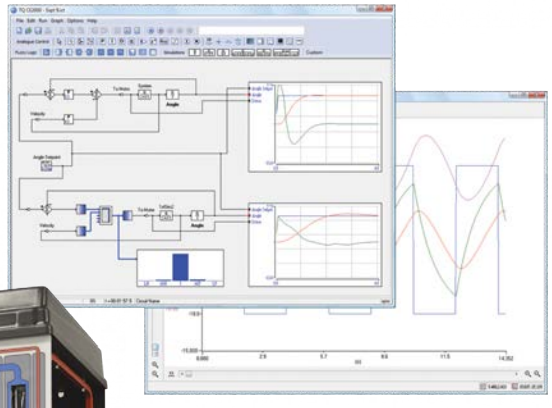
Automatic Data Acquisition: VDAS® is particularly useful when monitoring longer duration experiments.

Safe and Easy Set-Up: Low temperatures, safe connections and simple, hand-operated controls allow the safe and quick set up of experiments.

Control Engineering

The Control Engineering range focuses on the teaching of specific control principles relating to static and dynamic systems, as well as naturally unstable, non-linear, multi-variable and oscillatory systems.

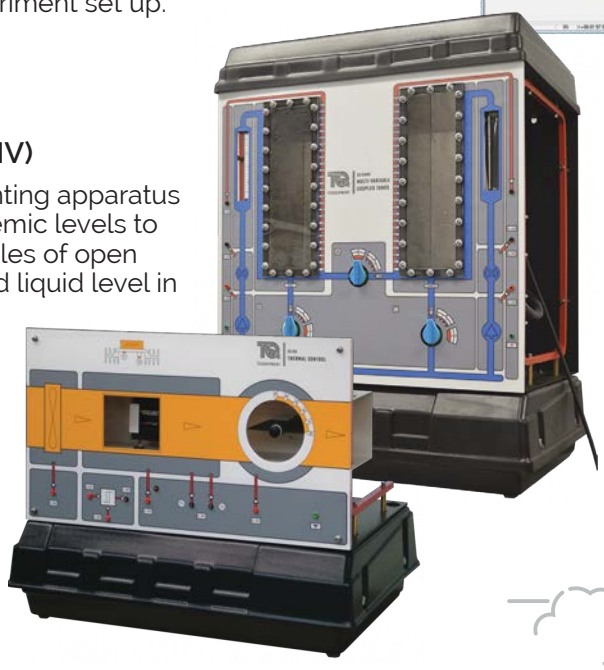
The majority of the range can be connected to TecQuipment's dedicated controllers with easy-to-use control software. The simple, low-voltage connections allow safe and quick experiment set up.



Product Highlights

Coupled Tanks Apparatus (CE105MV)

A compact self-contained bench mounting apparatus designed to allow students at all academic levels to investigate basic and advanced principles of open and closed-loop control of flowrate and liquid level in single and dual tank systems including multi-variable dynamics.



Thermal Control Process Apparatus (CE103)

A compact self-contained bench mounting temperature control apparatus designed to allow students at all academic levels to investigate the basic and advanced principles of control.

Control Software

Software that simulates control systems and works with TecQuipment's controller (CE120) or digital interface (CE122) to control and acquire data from the Control Engineering range.

Electrical Power Systems

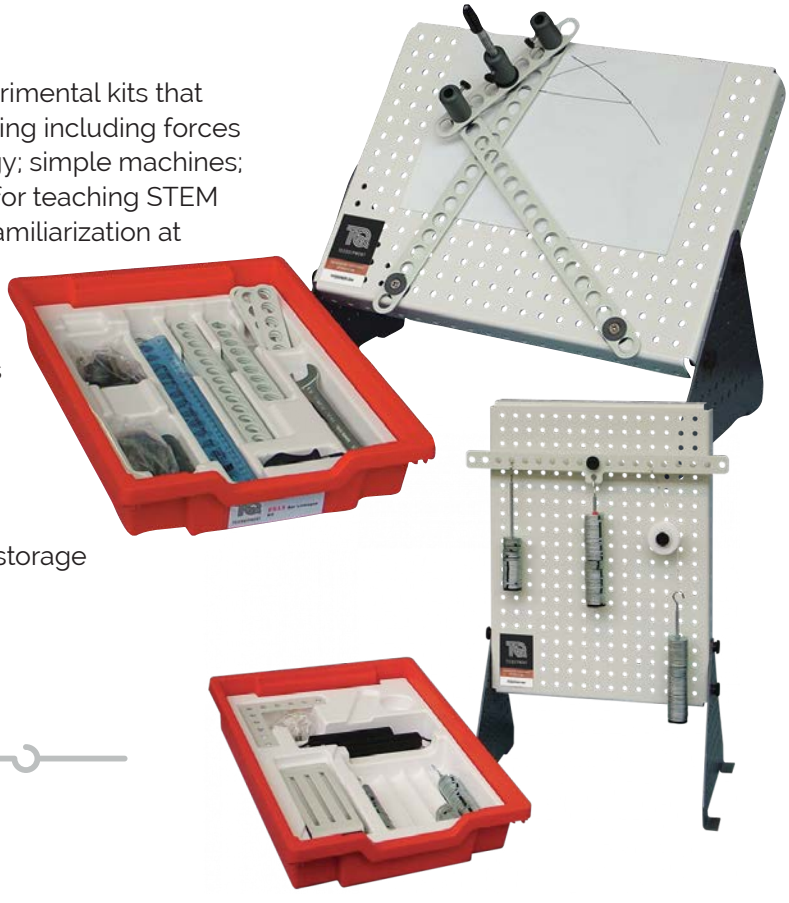
The electrical power systems range provides advanced technical teaching and training equipment for all elements of a power system including generation, transformation, transmission, distribution, utilization and protection.

The scalable products provide hands-on learning of power systems with the options of hardware and software additions, of a second generator and a SCADA system.

TECQUIPMENT

Engineering Science

The engineering science range is a modular system of experimental kits that address the fundamental principles of mechanical engineering including forces and moments; materials testing; vibration, friction and energy; simple machines; and mechanisms. The high quality, robust 'kits' are suitable for teaching STEM principles at a beginner level, while remaining relevant for familiarization at a post-graduate level. All the hardware required to do experiments related to a particular topic are contained within a kit. These are presented in a storage tray with a purpose-made insert and checklist to ensure all of the parts are returned at the end of the lab session.

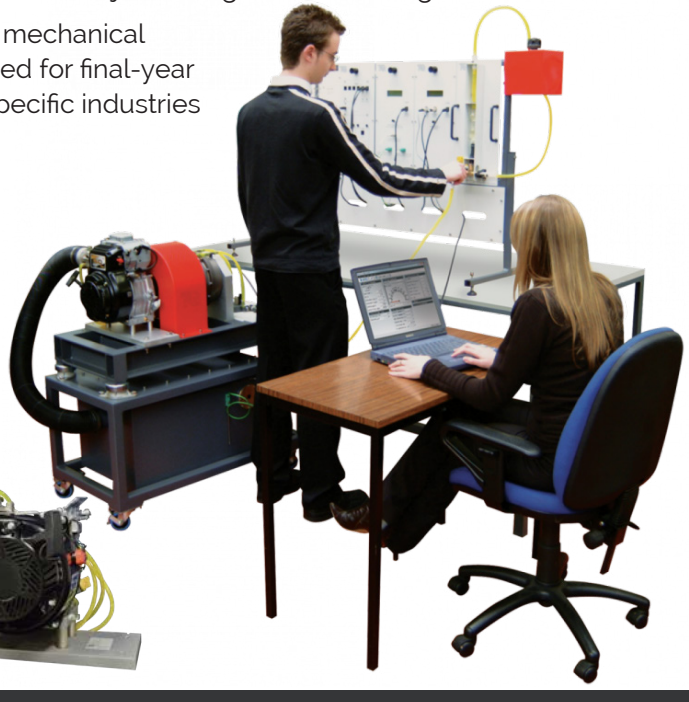


Kits can be purchased in any combination, from multiple kits for a whole class to perform the same experiment or a selection of individual kits for demonstrating a variety of different experiments. TecQuipment also sell purpose built storage trolleys for keeping the kits tidy while protecting them from damage when not in use.

Engines

The engines range offers teaching equipment for a wide variety of engine specific theory covering internal combustion engines starting with simple four-stroke engines, through to gas turbines/turbojets, along with steam engines.

The range meets entry-level requirements for the general teaching of mechanical engineering through to addressing the more advanced theories required for final-year students enabling them to meet the learning objectives required for specific industries such as aerospace, automotive and power.



Product Highlights

Small Engine Test Set (TD200)

Trolley-mounted, mobile engine test bed with bench-top instrumentation for investigations into the fundamental features of internal combustion engines. Requires at least one of the eight four-stroke petrol and diesel engines, available in pull or electric start (ES).

Environmental Control

The Environmental Control range offers teaching equipment covering the fundamental theories associated with thermodynamics, fluid mechanics and heat transfer. This enables students to understand environmental control in the real industrial and consumer world. Experiments allow students to explore the workings of cooling towers, refrigeration, air conditioning and humidity, utilizing psychrometric and P-h charts.

Most products in the range come with TecQuipment's *Versatile Data Acquisition System*, offering high specification and great value.

Cooling Towers

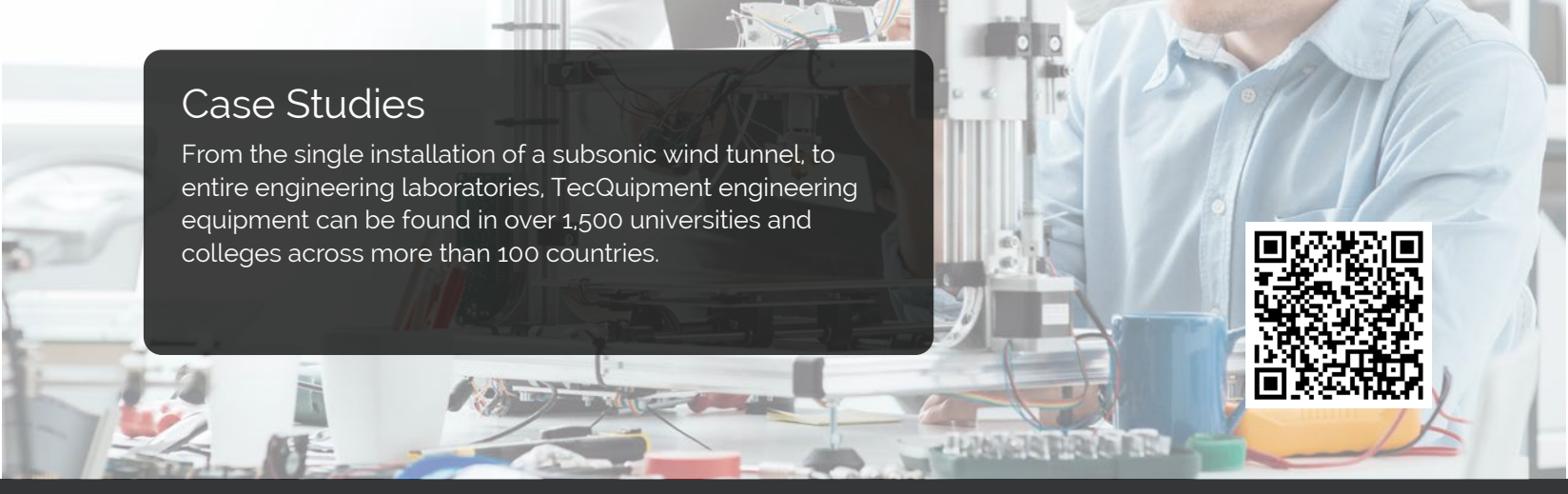
Bench-top apparatus that demonstrates the operation characteristics of an evaporative cooling tower.

Refrigeration Cycle

Bench-top apparatus that allows students to investigate and observe the stages of refrigeration, such as the coefficient of performance, superheat and subcooling.

Fundamentals of HVAC

The range provides the capabilities to study the fundamental components of an HVAC course.



Case Studies

From the single installation of a subsonic wind tunnel, to entire engineering laboratories, TecQuipment engineering equipment can be found in over 1,500 universities and colleges across more than 100 countries.

Fluid Mechanics

The Fluid Mechanics range offers a wide scope of teaching equipment for the delivery of complete courses in fluid dynamics.

Base Unit & Modules for Flexibility

In many settings, the modular Digital Hydraulic Bench (H1F) acts as a base unit, allowing tutors to swap out individually mounted experiment modules on these self-contained benches, reducing laboratory set-up time, space requirements, the need to be near a water source and cost. Modules include experiments for exploring Bernoulli's theorem, the function and dynamics of weirs, pressure and flow measurement, pipe friction and energy loss and much more.

Understanding Flow

The impressive flow and sediment channels, for demonstrating the mechanics of flow, also enable the practical teaching and demonstration of phenomena such as critical and sub critical flow, hydraulic jump, and dune formation. There are many ancillaries available for use with the flow channels, enabling them to be used as both teaching and research aids.

Topics Covered:

- Pumps and Turbines
- Open Channel Flow
- Flow and Pressure Measurement
- Hydrostatics and Properties of Fluids
- Vortices And Cavitation
- Pipe Friction and Energy Loss
- Hydraulic Bench
- Laminar and Turbulent Flow
- Hydrology
- Nozzles and Jets
- Pipe Surge and Water Hammer
- Flow Visualization
- Modular Fluid Power

Product Highlights

Modular Fluid Power Range MFP

The MFP range demonstrates real-world applications of fluid mechanics and includes pumps and turbines, which also provide a link to renewable energy. An easy-to transfer Universal Dynamometer (MFP100), with sensors for measuring power, speed and torque, provides motive power to seven different experiment modules.

Digital Hydraulic Bench

A mobile, self-contained bench with recirculating water supply. It provides water at variable flow rates direct to experiments and includes digital flow display for hydraulic and fluid mechanics experiments.

Flumes

A 300 mm wide, 5 to 15-metre long flume for student study and advanced research into a wide range of fluid flow topics. A huge range of ancillaries are available to extend learning potential and offers the opportunity for innovative experimentation.

Materials Testing & Properties

The Materials Testing and Properties products offer a wide range of teaching equipment to demonstrate key materials' properties; they cover Hooke's law and Young's modulus associated with elastic properties, and stress/strain analysis. For more advanced learning, experiments available progress to hardness testing, complex analysis of stress and strain, testing specimens to destruction and various apparatus for learning about material fatigue.

The range also extends into the area of structures and structural elements, providing supplementary products to the complete modular Structures range equipment.

Process Control Engineering

The Process Control Engineering range extends from bench-top products, made for demonstrating control principles, to equipment using industrial parts for vocational training.

All the process control products allow easy connection and adjustments, for a more practical understanding of principles.

Product Highlights

PLC Process (CE111)

A self-contained bench-top liquid flow and level process, providing a physical system to experience the programming of programmable logic controllers, for use with the PLC Trainer (CE123).

PLC Trainer (CE123)

Uses an industry-standard PLC to control the PLC process using ladder logic programming running on a PC. For use with the PLC Process (CE111).

Process Trainer (CE117)

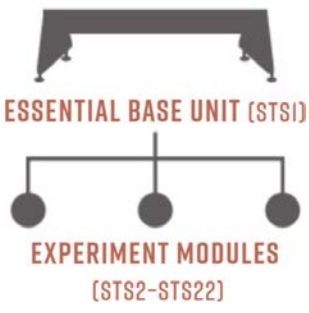
A self-contained bench-top, fully integrated teaching apparatus that mimics industrial process engineering, including a comprehensive range of experiments in flow, level, pressure and temperature, ranging from basic theories through to more advanced principles.

Next Generation Structures

The next generation Structures range is compact, robust and offers a clearer demonstration of experiments. It builds on the tried and tested modular technology but is easier to set up and use, taking performance to the next level.

The new bench-top platform-based mounting frame (STS1) is solid and stable, allowing easy viewing of experiments from all angles: perfect for use by groups of students and for longer range viewing in classroom demonstrations.

The 21 experiment modules teach basic structural principles relating to beams, bridges, cantilevers, arches, struts, davits, weight, reaction, moment, shear force and torsion.



Arches, Bridges and Trusses

- Pin Jointed Frameworks (STS8)
- Three-Pinned Arch (STS9)
- Two-Pinned Arch (STS10)
- Fixed Arch (STS11)
- Redundant Truss (STS17)
- Simple Suspension Bridge (STS19)
- Suspended Beam Bridge (STS21)

Deflections and Stress

- Deflection of Beams and Cantilevers (STS4)
- Bending Stress in a Beam (STS5)
- Continuous and Indeterminate Beams (STS13)
- Curved Bars and Davits (STS14)
- Frame Deflections and Reactions (STS18)

Failure

- Euler Buckling of a Column (STS12)
- Plastic Bending of Beams (STS15)
- Plastic Bending of Portals (STS16)

Moments

- Bending Moments in a Beam (STS2)
- Shear Force in a Beam (STS3)
- Bending Moments in a Portal Frame (STS20)
- Equilibrium of a Simply Supported Beam (STS22)

Torsion

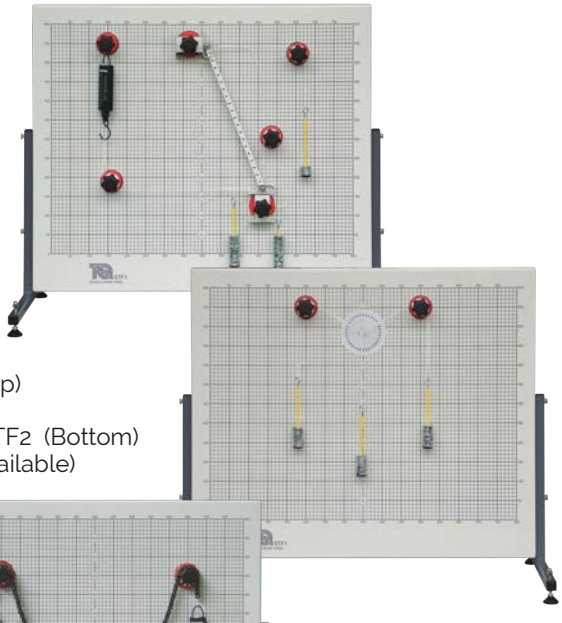
- Torsion of Circular Sections (STS6)
- Unsymmetrical Bending and Shear Centre (STS7)

TECQUIPMENT

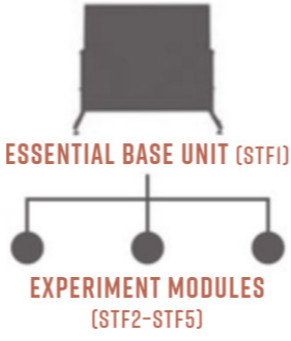
Statistical Fundamentals

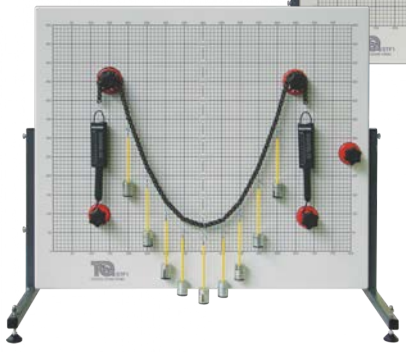
The Statics Fundamentals range offers teaching equipment for understanding the core principles required for civil and mechanical engineering disciplines. The content brings to life theories, such as concurrent and non-concurrent coplanar forces, Bow's notation, equilibrium theory, parabola theory and many more.

The range consists of a series of modular experiment kits that fit to the essential base unit (Statics Work Panel), these can be mixed and matched to suit teaching requirements.



Equilibrium of a Rigid Body STF3 (Top)
Equilibrium of Forces STF4 (Middle)
Suspension Cable Demonstration STF2 (Bottom)
Equilibrium of a Beam STF5 (also available)





Theory of Machines

The Theory of Machines range offers teaching equipment for the basics of machine engineering, such as motion, to more advanced studies of free and forced vibration, friction in bearings, geared systems and governors.

Safe Yet Highly Visible

Due to the amount of fast moving parts in this range, extra safety features have been incorporated. Interlocked guards prevent accidents, while care has been taken in the design process not to compromise the visibility.

Free and Forced Vibrations TM1016V
Investigates the free and forced vibrations of a rigid beam with a spring, and a simply supported beam. Demonstrates Rayleigh's approximation and Dunkerley's method.

Static and Dynamic Balancing TM1002
Bench-top apparatus for experiments in balancing a rotating mass system, statically and dynamically.

Gyroscope TM1004
Bench-top apparatus for experiments in gyroscopic couple and velocities of rotor and precision.

Thermodynamics

The Thermodynamics range offers teaching equipment for the illustration of the basic principles of thermodynamics through to complex theories. Students can learn using practical experiments about the behavior of gases, heat transfer and thermal conductivity, conduction, convection and heat exchange. They can get hands-on experience to prove theories such as the Antoine equation, Seebeck effect, Lenz and Thomson effects, Carnot cycle and reversible Carnot cycle, Stefan Boltzmann law, Kirchhoff's law and Lambert's direction law.

Topics Covered:

- Compressors
- Heat Transfer
- Thermodynamic Principles
- Steam
- Temperature

Safe, Practical and Realistic

As thermodynamics experiments can often take many hours, the range has been designed to reduce the experiment time to a practical and realistic level, with safety as the key aspect.

Product Highlights

Bench-top Heat Exchangers TD360

A modular system made up of a bench-top base unit (TD360) and four optional experiment modules, for examining and comparing small-scale heat exchangers to help students understand how they work.

- Concentric Tube Heat Exchanger (TD360a)
- Plate Heat Exchanger (TD360b)
- Shell and Tube Heat Exchanger (TD360c)
- Jacketed Vessel with Coil and Stirrer (TD360d)

Heat Transfer Experiments TD1002

Four optional experiment modules and a bench-top base unit (TD1002) form a modular system, for demonstrating different methods of heat transfer.

- Linear Heat Conduction Experiment (TD1002a MkII)
- Radial Heat Conduction Experiment (TD1002b)
- Extended Surface Heat Transfer Experiment (TD1002c)
- Conductivity of Liquids and Gases Experiment (TD1002d)

Versatile Data Acquisition System (VDAS®)

VDAS® is a high capacity, accurate, efficient and user-friendly automatic data acquisition hardware and software package that works with a growing list of over 60 TecQuipment products, enabling real-time display and capture of experiment data.

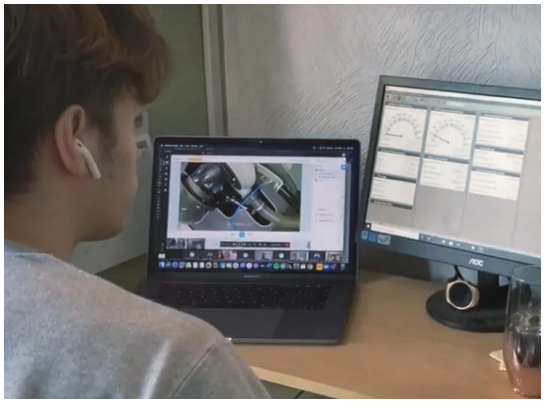
Live experimental data direct from the laboratory can be processed by an unlimited number of remote students.

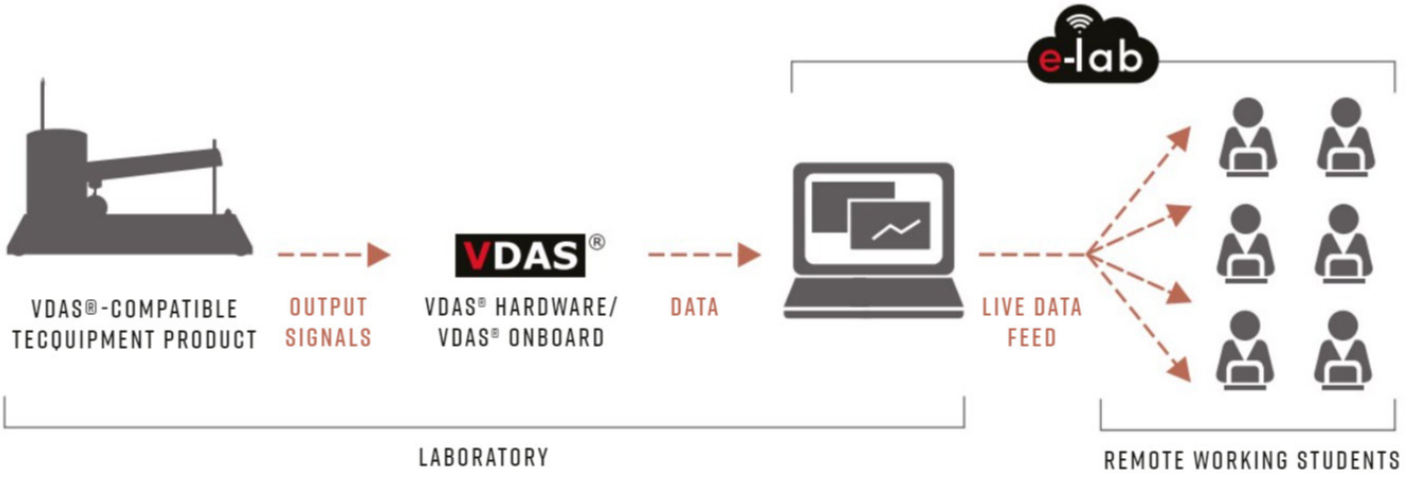
Remote Working Solution

Introducing VDAS® e-lab

VDAS® e-lab is software that works with TecQuipment's VDAS®-enabled products that can be used remotely, allowing students to interactively engage and participate in laboratory experiments for an adaptable, blended learning approach.

- Provides automatic calculation, recording, charting and data export remotely
- An unlimited number of students can simultaneously acquire and process live experiment data remotely from their computer, just as they would in the laboratory
- Students can individually manipulate the experiment data remotely
- Intuitive and easy to use, with clear, customizable display and layout options
- To monitor engagement, the connection status of students are time logged
- Suited to remote classroom demonstrations, laboratory experiments and group work
- Low network bandwidth requirement of 1 Mbps to increase accessibility guide





Remote View Hardware

Optional selections of cameras, fittings, rods and tripods for use with TecQuipment's VDAS®-enabled products for live streaming demonstrations.

Available bundles include:

- Cameras and Tripods
- A selection of fittings specifically for use with TecQuipment products
- Magnetic base
- Various lengths of rod
- A huge range of possible camera angles
- Hub for multiple cameras

About TecQuipment

Teaching Apparatus and Software for Flexible Teaching Approaches

TecQuipment designs, develops and produces a comprehensive range of products for engineering training. The company is well known as a preeminent provider of technical teaching equipment for universities worldwide.

TecQuipment operates a constant product improvement process to guarantee that the teaching equipment stays ahead of the competition and meets customers' needs. The product ranges are reviewed and updated, and new products are developed as curricula change. Manufacturing on-site enables the engineering team to work alongside production to guarantee that quality products are designed and produced to give end-users many years of safe, accurate and reliable usage.

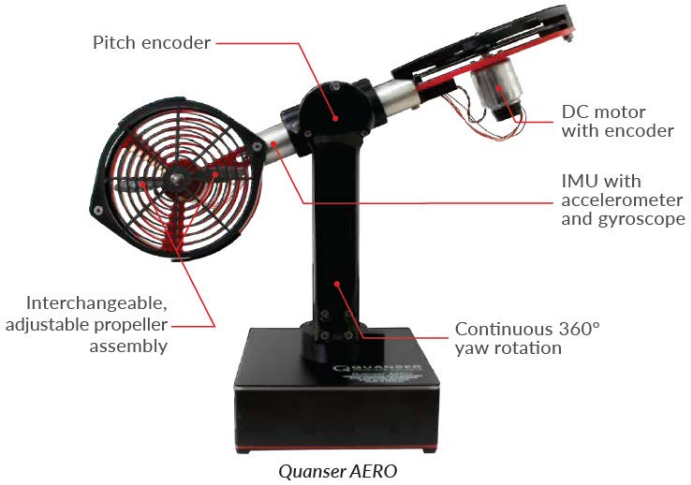
Aerospace Control & Dynamics

Quanser offers a complete range of products for hands-on labs for Aerospace Engineering. Quanser systems feature the precision and deterministic dynamics to support the theory. The robustness and flexible architecture of the products also make them ideal motion validation platforms for research.

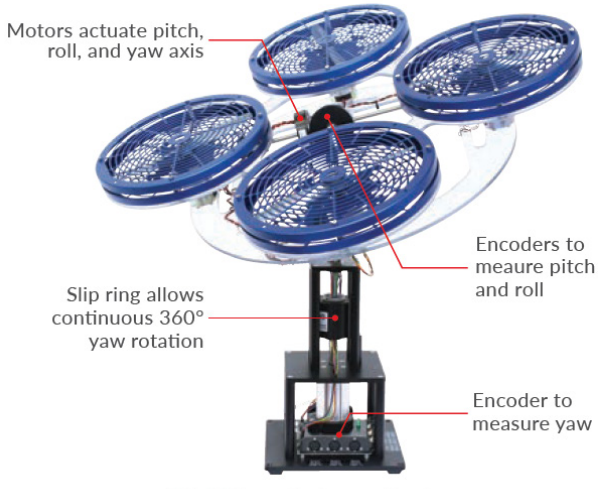
Product Highlights

Quanser AERO

The Quanser AERO is a unique platform that allows students to explore and gain insight into the dynamic complexities of flight applications. At its core, the Quanser AERO is a high-precision, plug-and-play physical system to study helicopter and quadcopter flight motion and control. Applications include 1 DOF attitude control, conventional 2 DOF helicopter flight, and even quadcopter dynamics and control. Reconfigurable elements let you quickly adapt the Quanser AERO to modern applications in mechatronic systems design.



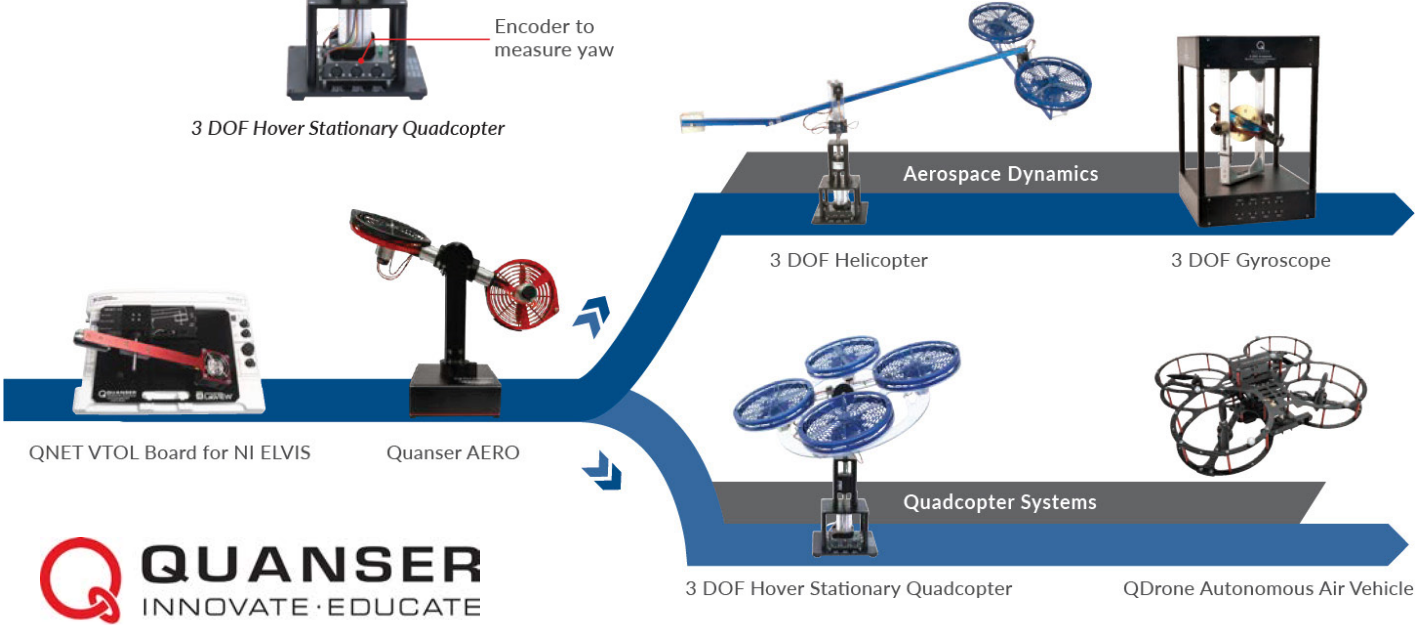
Quanser AERO



3 DOF Hover Stationary Quadcopter

Quadcopter Systems

The quadcopter or quadrotor configuration is a principal configuration for modern autonomous flying vehicle design. Quanser's unique line of products take you from first principles to actual quadcopter flight.

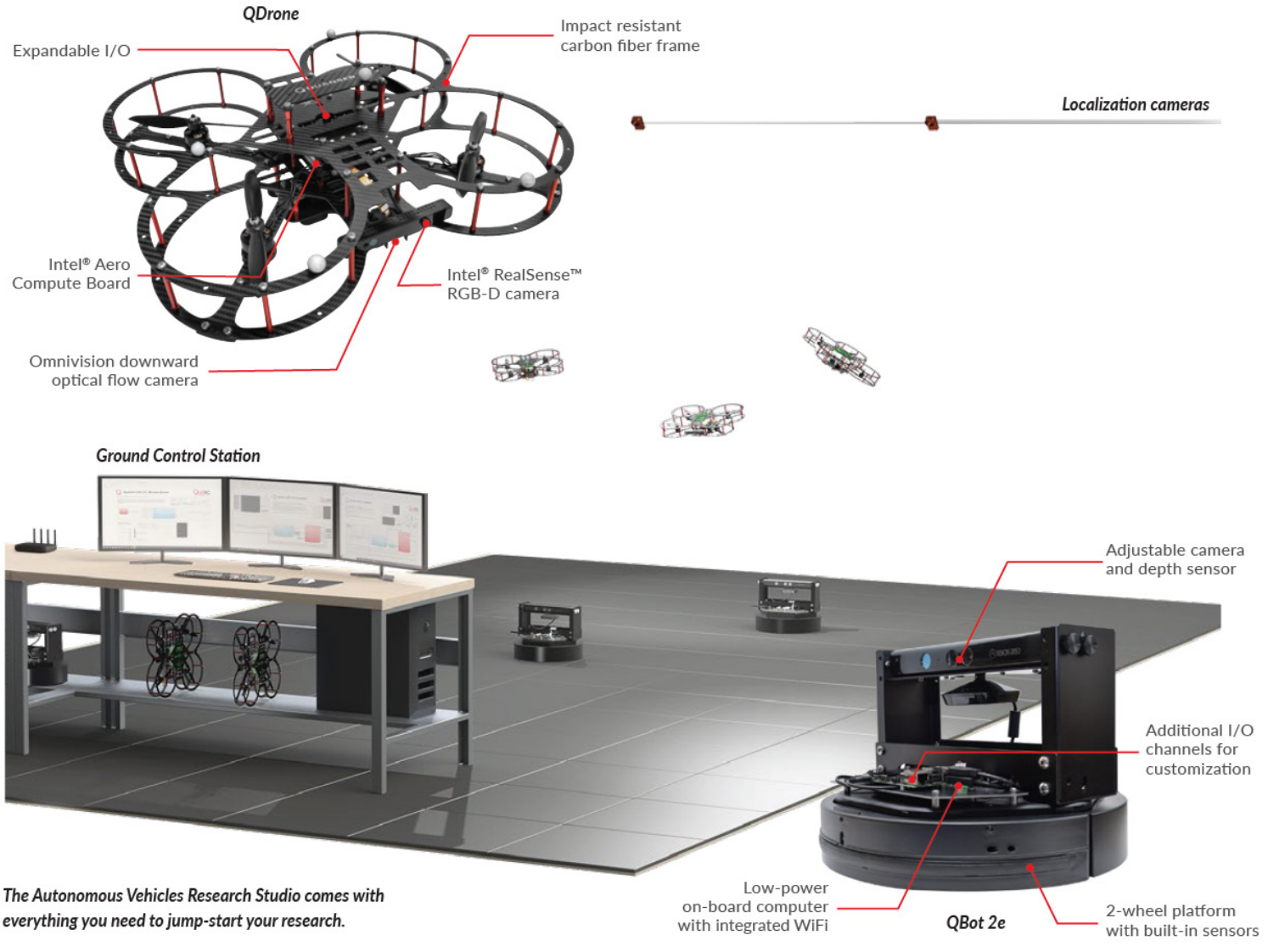


QUANSER
INNOVATE·EDUCATE

Autonomous Vehicles Research Studio

AEROSPACE CONTROL & DYNAMICS | MOBILE ROBOTICS | ROBOTICS

At the center of the Research studio are two autonomous vehicles for air and ground: the **QDrone** and **QBot 2e.** The QDrone is a quadrotor air vehicle equipped with powerful on-board Intel® Aero Compute Board, multiple high resolution cameras and built-in WiFi capability. On the ground the QBot 2e is an innovative open-architecture autonomous ground robot, equipped with a wide range of built-in sensors and a vision system. Working individually or in a swarm, these are the ideal vehicles for your research applications.



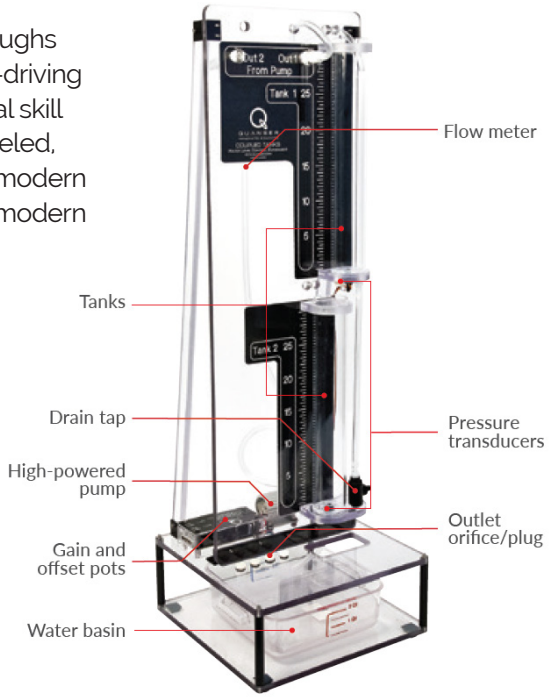
The Autonomous Vehicles Research Studio comes with everything you need to jump-start your research.

Studio Architecture

The research studio software architecture is powered by QUARC™ for Simulink®, and is designed to provide key functionalities required for multi-vehicle research through a variety of customizable modules. Each module is powered by QUARC's communication framework to be target independent. This enables researchers to build high-level applications and reconfigure low-level processes supported by pre-built modules and libraries. Using these building blocks you can explore topics in advanced flight control, machine vision, SLAM, autonomy and more.

Control Systems

Control systems lie at the core of the most exciting emerging technological breakthroughs of the modern age. From drones and reusable rockets, to advanced robotics and self-driving vehicles, the fundamentals of control systems design and implementation are a critical skill for engineers to compete and innovate in the modern workforce. Quanser offers modeled, repeatable and reliable control plants that offer students hands-on experience using modern control tools and approaches to solve control problems that are analogous to typical modern industrial challenges.



Coupled Tanks

Product Highlights

Process Control

The modern industrial systems that are fundamental to modern automation and manufacturing processes require specialized control systems to perform and manage their daily operations. Quanser offers a variety of plants that can be used to teach the key elements of modern process control including cascade control with the Maglev and Ball and Beam systems, as well as regulator design with the Coupled Tanks.

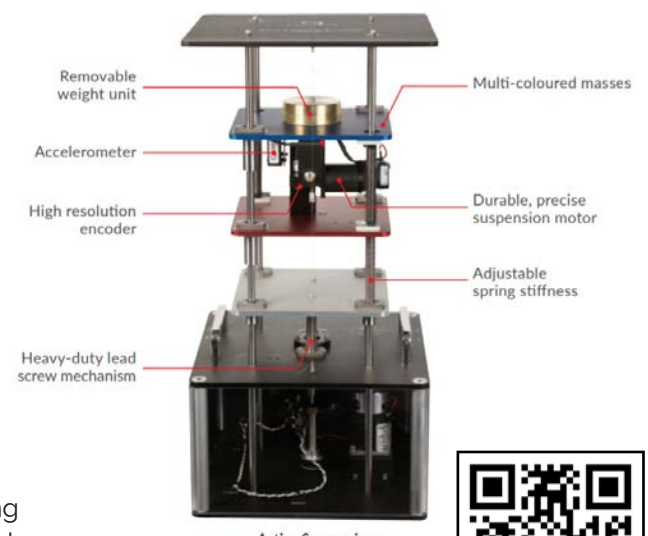
Rotary Servo Base Unit with Inertia Loads

Classic Systems Control

The classic progression of control systems education begins with the fundamentals of modeling and designing control plants for linear systems. Quanser offers a diverse collection of plants that can be used as ideal platforms to offer students experience using classic control principles. These plants offer basic dynamics that range from rotary to linear motion.

Modern Systems Control

Quanser has a collection of plants that can be used to show how a modern approach to control systems allows for the creation of precise controllers for complex systems with higher-order dynamics. These plants include both dynamically complex plants such as the linear inverted pendulum, and double pendulum, as well as plants such as the active suspension that require the use of both state-space modeling to express the complex coupled dynamics of the system.



Active Suspension

Unstable Systems

Some of the most exciting emerging technologies from bipedal walking robots to reusable rockets requires the design of controllers for unstable systems. Quanser offers several plants that give students an experience creating control systems for directly analogous dynamic systems.

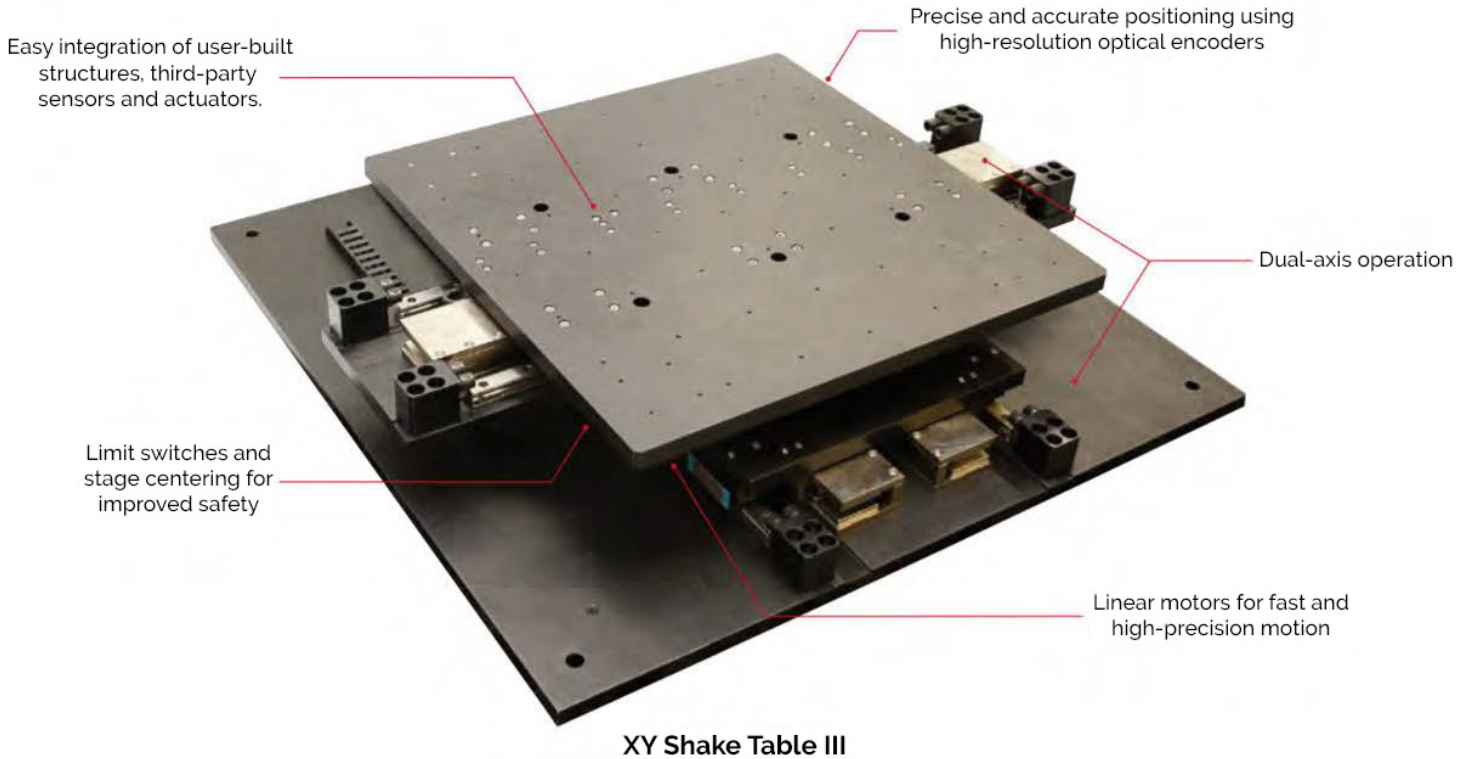
Earthquake Engineering & Structural Dynamics

A variety of shake tables and smart structure systems – complete with powerful and flexible software – to satisfy your teaching and research needs.

Product Highlights

Motion Simulators

The Quanser line of motion simulators spans from linear to planar shake tables and multi-DOF heavy load devices capable of simulating motion and earthquakes with various acceleration profiles. With no hydraulics involved, these systems are clean, quiet and require minimal maintenance. That makes them ideal for any lab - whether you want to demonstrate and study dynamic and seismic response of different structural designs or geomaterials, determine natural frequencies in multi-DOF structures, or develop and test various dampers and sensors for structural health monitoring. The value of the Quanser turn-key motion simulator systems is further extended by open architecture and scalable design, allowing you to add sensors, or use your own test structures.



XY Shake Table III

More Flexibility For Your Experiments

Using two or more Shake Table II units is a cost-effective way of creating a setup for multi-point or bi-directional shaking experiments. With these configurations, you can test the seismic response of different structural designs simultaneously, see the effects of earthquakes on structures with multiple supports, work with higher payloads, or simulate xy motion.

Smart Structures

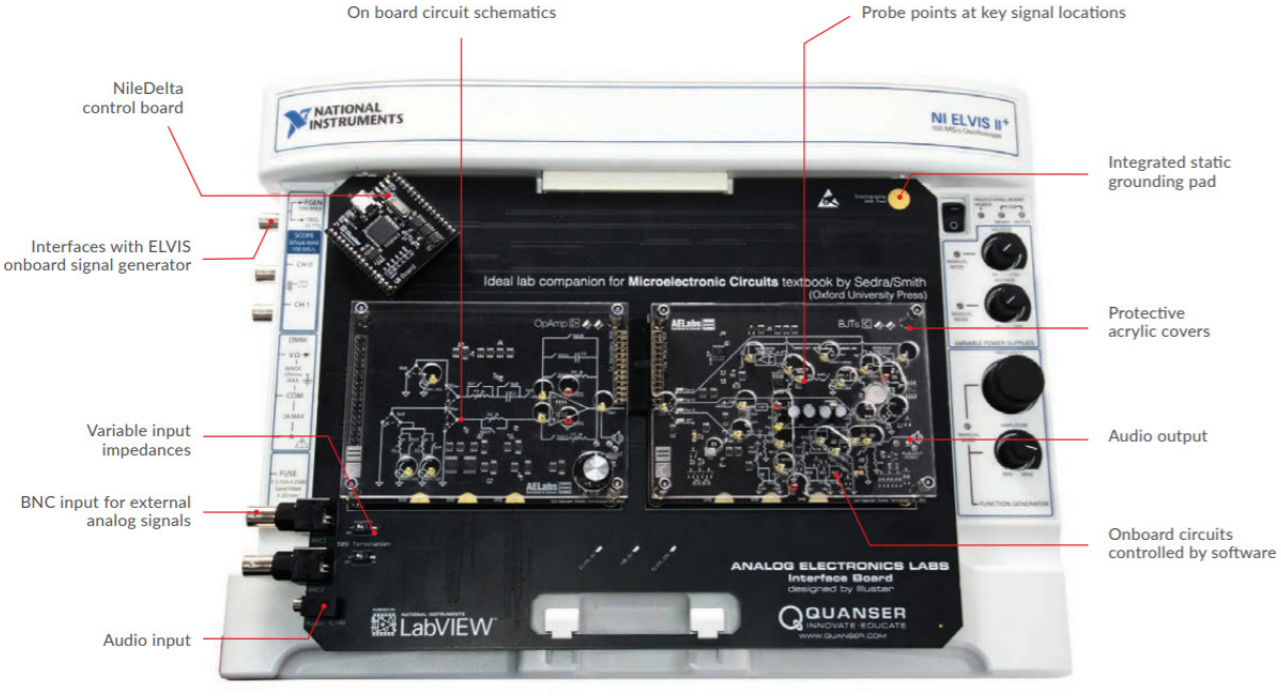
Quanser smart structures are designed for demonstration and study of the dynamic response of tall structures to vibrations, and to investigate and develop control techniques to actively dampen the deflection of the structures. The smart structures can be mounted on the Quanser Shake Tables.

Electrical & Computer Engineering

Electrical and Computer Engineering courses present specific challenges in the lab. Traditional ECE labs center around wiring circuits and taking measurements, however, the tools involved often interfere with, rather than enhance, the learning experience. With Quanser ECE lab solutions, you can give your students hands-on experience with ECE concepts that far exceed the limitations of breadboards and banana cables. Quanser's line of Electrical Engineering lab solutions focus on integrated instrumentation and flexible onboard circuitry to give students in-depth control via safe, robust, easy-to-use tools.

Analog Electronics

Analog circuits, including semiconductors, amplifiers and filters remain central to the operation of all electronic systems. Even in our current engineering climate of overwhelmingly digital solutions, analog circuits are still relevant. Quanser, together with Illuster Technologies have created a comprehensive lab that teaches the fundamentals and importance of analog electronics. With AELabs, students can configure, observe and experiment with complex analog circuits, such as MOSFET amplifiers.



OpAmp and BJT boards shown

Power Electronics

Traditional power electronics labs have always focused on large format industrial hardware operating at high voltage. These systems are simply not accessible or safe enough for students to get the hands-on experience they need with power systems and circuits. In partnership with National Instruments, Quanser is changing the way students experience power electronics. With a fully integrated lab-bench power system operating at safe voltages, Quanser is paving the way for a new kind of electronics lab.

Embedded Systems

Quanser leverages the NI ELVIS platform and the intuitive visual programming environment of LabVIEW to allow students to control low level functions of a PIC microcontroller. Students can then learn how to leverage interface protocols to interact with digital systems using a proven, robust hardware implementation.

QUANSER
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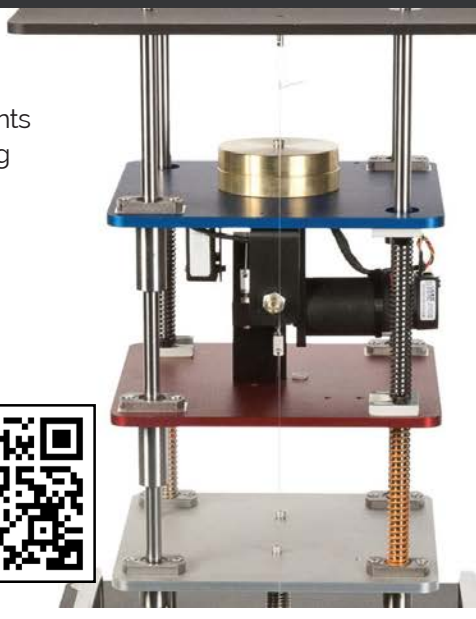
Mechanical Engineering

Mechanical engineering is one of the oldest and broadest of the engineering disciplines. Students require a broad range of skills and knowledge to be successful in their careers. This engineering discipline combines engineering physics and mathematics principles with materials science to design, analyze, manufacture and maintain mechanical systems. Learning solutions offered by Quanser provide the tools necessary to teach the skills needed for mechanical engineering.



Product Highlights

Active Suspension

The Active Suspension is an ideal platform to teach active control challenges for a quarter-car model. This plant setup offers senior mechanical engineering students unique, hands-on learning relevant to today's automotive industry.

Also available: 3 DOF Gyroscope, Linear Servo Base Unit with Inverted Pendulum, Rotary Servo Base Unit, and QLabs Virtual Rotary Servo.

Mechatronics

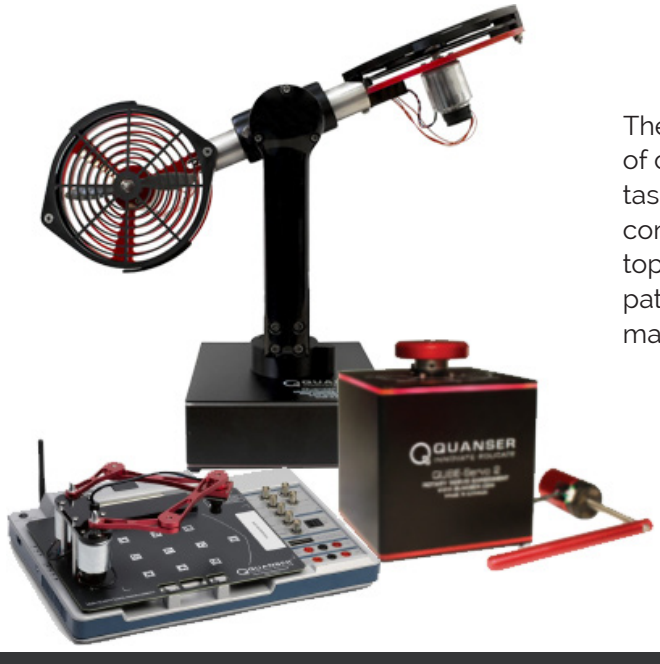
With Quanser's mechatronic solutions, instructors can focus on teaching fundamentals of the mechatronic subsystems and advanced applications with fully developed robust hardware powered by rigorous software.

Fundamentals

Mechatronic systems bring together aspects of mechanical engineering, electronics, control systems and computer engineering. In order to bring these aspects together, Quanser has designed a set of Engineering Trainers (QNETs) that teach the fundamentals of mechatronics. Built exclusively for the NI ELVIS platform, the QNET Mechatronic Sensors, Actuators, Interfacing and Systems boards are designed to teach these core concepts all in a powerful, intuitive LabVIEW environment.

Integrated Systems

Quanser has a wide variety of products to teach system integration. The QNET Mechatronic Systems board is the flagship systems trainer with hardware, software and courseware developed specifically to teach mechatronic systems integration. From actuators and FPGA sensor integration, through mathematical modeling and image processing, to state machines and advanced applications, the QNET Mechatronic Systems board offers a rich experience for students.



The **QUBE-Servo 2** and **Quanser AERO** also offer students a series of challenges that lead them towards more advanced integration tasks including flight control of a virtual V22 Osprey, and cruise control of a virtual vehicle. Further opportunities to extend the topics covered by all of the Quanser products open up a variety of pathways for instructors to educate, and students to innovate, no matter what be the engineering background.

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Robotics and Autonomous Systems

Quanser is the only company taking a comprehensive approach to robotics tuned to the academic environment. Whether you are developing advanced algorithms as part of an ambitious research program, or you need state of the art technology and thinking to teach the next generation of robotics engineers, the Quanser product line has the perfect option for your needs.

Mobile Robotics
Quanser's mobile robotics solutions offer a unique combination of advanced hardware with a powerful software framework powered by Quanser's renowned QUARC® built on the MATLAB®/Simulink® platform. Quanser offers options for ground and aerial vehicle applications featuring the latest processors and flexible support of sensors. Combine them together to create a UVS Lab that offers full localization and a comprehensive platform for multi-agent applications.

Manipulator Robotics
The study and exploration of serial link robots has been a core part of robotics education and research for many years. Initially driven by applications in manufacturing, it is now a key subsystem in more complex robotic applications. As a leader in providing open architecture robotic solutions, Quanser's 4 DOF and 6 DOF Joint Control Robots can meet your teaching and reseach needs.

Open Architecture Research Robots
Quanser's research solutions allow you to deploy your own advanced control algorithms by providing students and researchers direct access to the robot's sensors and actuators. With the capabilities of the communication block sets of Quanser's QUARC software validating your robotic control algorithms is easier than ever.

Telerobotics and Haptics
This solution is the platform of choice for advanced telerobotic applications with haptic feedback. It consists of an advanced robot manipulator equipped with a force/torque sensor mated a high DOF haptic manipulator and Quanser's QUARC real-time control software. This turn-key solution can be deployed quickly and is readily adaptable for a wide range of force-feedback research applications. Combined with visualization, it is the ideal platform for medical simulations, remote vehicle operations, and more.

Product Highlights

QArm

Quanser's QArm is a 4 DOF serial robotic manipulator with a tendon-based two-stage gripper and an RGBD camera, designed for modern engineering education and academic research applications. Leveraging the intuitive graphical interface of Simulink® or expandability of Python™ and ROS, students get a systematic understanding of the design of robotic systems and concepts, including joint control, kinematics, path planning, statics and dynamics. QArm comes with comprehensive studio-type course resources to motivate students and provide the basis for interactive challenges.

Self-Driving Car Research Studio

The Quanser Self-Driving Car Research Studio is a highly expandable and powerful platform designed specifically for academic research. Use it to jump-start your research and scale your vehicle fleet, while leveraging multiple software environments. The studio brings you the tools and components you need to test and validate dataset generation, mapping, navigation, machine learning, artificial intelligence, and other advanced self-driving concepts.

Testing & Measurement

Measurement and instrumentation is a fundamental topic in engineering. Without accurate and reliable measurement of physical quantities such as temperature, strain, pressure, and position we will not be able to reliably monitor and control processes. Having an in-depth understanding of the concepts allows engineers to design, implement, and maintain complex engineering systems. With Quanser's measurement and instrumentation line of products, you can teach the fundamentals of sensors, signal conditioning and computer-based data acquisition.

Sensors and Signal Conditioning

Quanser's line of measurement and instrumentation products are suited to teach and demonstrate the fundamentals of common sensors and signal conditioning by allowing students to measure real-world physical quantities.

Introduction to Sensors

Our engineering trainer boards incorporate a comprehensive range of sensors and switches, ideally suited for teaching introductory electro-mechanical measurement, sensor behavior, and calibration techniques.

Mechanical Motion Measurements

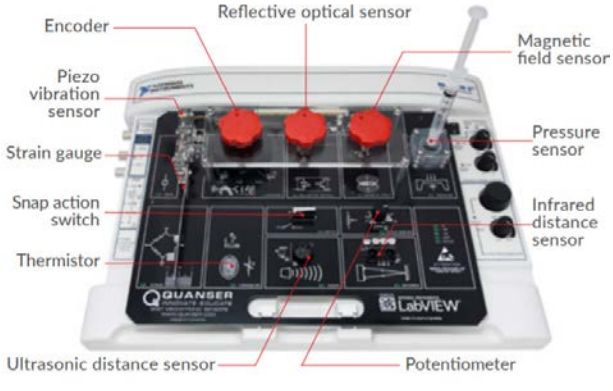
The modular rotary motion platform is ideal for measurement and calibration of strain, angular displacement, angular velocity, vibration and actuation.

Fluid & Pressure Measurement

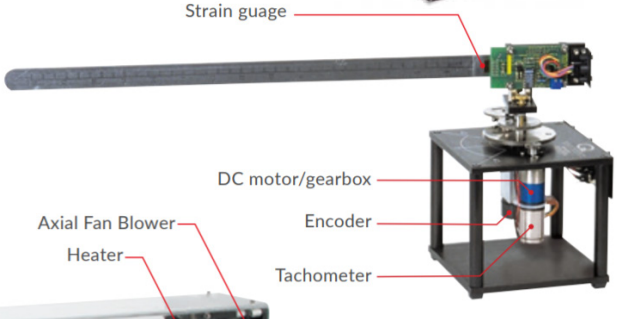
The Coupled Tank is a bench-scale plant suited to introduce measurement and calibration of fluid flow, liquid level and pressure (see page 17).

Temperature Measurement & Control

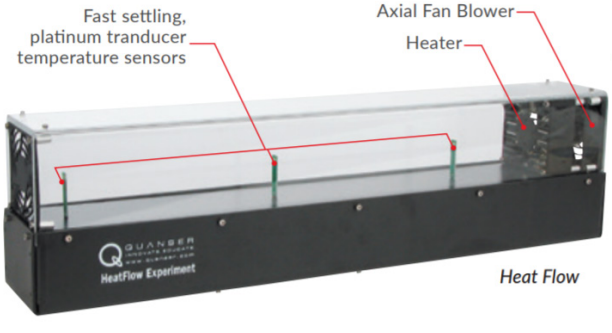
The Heat Flow introduces students to temperature measurement and control techniques. It is equipped with a coil-based heater and a blower, and three fast-settling platinum RTD temperature sensors.



QNET Mechatronic Sensors Board
NI ELVIS II+ sold separately



Rotary Servo with Flexible Link



Heat Flow

Data Acquisitions Systems

Quanser's line of measurement and instrumentation products are suited to teach and demonstrate the fundamentals of common sensors and signal conditioning by allowing students to measure real-world physical quantities.

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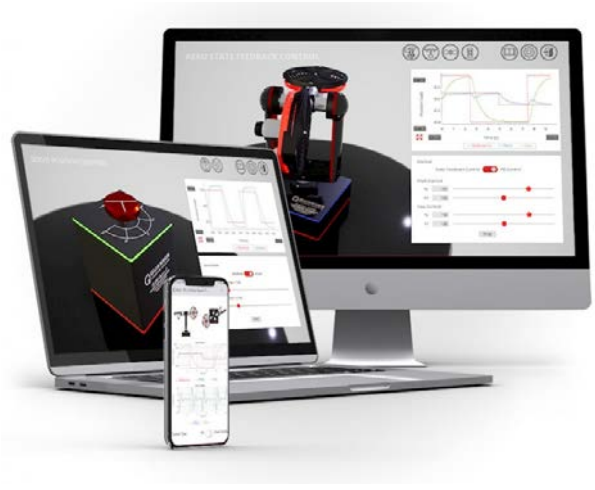
Digital Experience

Credible, interactive virtual hardware experiences



Quanser Interactive Labs

Quanser Interactive Labs software allows you to provide hardware-based lab exercises to your engineering students anywhere, anytime, on any device. It works well in a remote learning environment, or combined with in-person lectures.

Quanser Interactive Labs give students virtual lab experiences on **Windows, MacOS, iOS, and Android**. QLabs come with a complete curriculum, including "check your understanding" and full assessment questions and lab reporting.

Available QLabs:

- Controls
- Ball and Beam
- Coupled Tanks
- QArm
- QBot 2e
- Quanser AERO
- QUBE-Servo 2
- Rotary Flexible Link
- Rotary Servo

Sign up for an online demo!

Today's learning demands a more agile environment. TecSolutions supports all aspects of engineering education to empower educators to better tune their teaching environment to the their students' whether remote, hybrid or in-person.

Quanser Interactive Labs not only offers students credible lab activities accessible off-campus, they can also be integrated into your lectures to bring even more interaction and engagement to your courses.

Ready to learn more?

The Most Trusted Name in Research

Quanser systems offer a highly efficient platform for bridging the gap between advanced theoretical and algorithm framework and real-world implementation. Browse our growing collection of research papers that demonstrate how Quanser systems help researchers around the globe to validate their concepts.

over 2,000
Academic Papers!

#ValidateWithQuanser

Chemical Engineering

Established World-Class Manufacturer

PIGNAT has been manufacturing high-quality training and research equipment using only industrial components since 1966.

Customized Solutions Available

PIGNAT's engineers work with educators to design computerized prototypes and virtual 3D prototypes prior to installation.

On-Site Installation & Training

The technical expertise of PIGNAT's engineers and trainers is unparalleled; and we ensure that all of the equipment has the necessary electrical approvals prior to training.

Product Highlights

Controlled Distillation Unit - OTP-DC

Pignat's Controlled Distillation Unit is an automated, controlled, continuous distillation pilot plant. This industrial-scale unit allows students to study unit operations, maintenance and process supervision. Expertly-crafted glass components show fluids as they flow through the process. The column (six-inch diameter) can be fed at several feed points along the stainless steel plates placed across the column.

Flow transmitters, temperature sensors and pressure indicators allow the user to monitor the process and study the influence of the process parameters and operating conditions. The DCS and software application developed for this unit allows parameter variations, process automation and data acquisition in real time or historical. The trainer also supports the study of transitional phases, equilibrium conditions, multivariable process implementation and more. The unit is also customizable to fit your specific process needs.

Continuous Distillation - DVI/100

Pignat's compact, benchtop Continuous Distillation trainer (DVI/100) allows students to operate a continuous distillation process. Expertly crafted glass components show the flow of fluid through the complete process in both liquid and gaseous phases. With an efficient startup time, steady-state operation can be reached in 20 minutes.

A digital touch screen HMI controls operating parameters (flowrates, reflux ratio, heating, etc.) and displays real-time measurements across the process. Data is saved for later analysis. The trainer can also be used for the study of mass and thermal balance, yield, hydrodynamics of a column, flooding conditions, packing factor and more. Educational handbook and technical manual included.

Power Engineering

Adaptable modular design allows easy integration into existing programs.

Lucas-Nuelle offers a wide variety of training systems on the generation, distribution and management of electrical energy. Some of those systems include power engineering training systems, distribution training systems, transformer training systems and more!

Your benefits:

- Comprehensive, well-rounded program – spanning power generation and distribution techniques all the way to energy usage and consumption
- Integration of renewable energies into conventional power engineering
- System monitoring and controlling using SCADA (Supervisory Control and Data Acquisition)
- Modularly designed experiment panel system for the step by-step, experiment-based exploration of system interdependencies
- Bus structure of all voltage levels permits rapid and transparent experiment setup
- Realistic simulation model of a 380-kV transmission line with 300-km and 150-km sections
- Use of conventional industrial components in cutting-edge digital technology
- High work-safety standards through the exclusive use of safety sockets and safety connecting leads
- Protective technology measures for all areas of power engineering

Product Highlights

Smart Grid | Micro Grid

Training systems on the generation, distribution & management of electrical energy:

- Power engineering
- Distribution
- Energy generation
- Renewable energy generation
- Transformer
- High-voltage transmission lines
- Protective systems
- Energy management
- Smart grid

These systems have been designed in anticipation of the newest developments.

UniTrain

The Mobile Desktop Laboratory for Electrical Engineering

- High quality laboratory equipment with virtual instruments
- Basic and advanced electrical engineering, electronics and automotive technology
- Wide range of multimedia courses available
- LabSoft, an open experiment delivery platform
- Intelligent measurement interface supplies analog and digital measuring as well as control I/O
- Faults simulated by the hardware as well as tests of knowledge

3D Printers: *PolyJet*

stratasys

PolyJet 3D Printers give you and amazing range of material options, and can even let you combine several materials in one 3D printed model. Do things you never thought possible with 3D printing, like simulated overmolding, flexible, multi-colored prototypes, ergonomic tooling, or simultaneous printing of diverse parts.

Benefits of PolyJet 3D Printing

Exceptional detail, surface smoothness and precision.

- Create smooth, detailed prototypes
- Produce accurate molds, jigs and fixtures
- Achieve complex shapes, intricate details and delicate features
- Incorporate the widest variety of colors and materials into a single model

J55 Prime

From fast concept models to quality high-fidelity models, the office-friendly Stratasys J55 3D printer is an affordable option for maximum designer output.

J35 Pro

Get all the benefits of an in-house engineering-grade printer without the hassle thanks to a small footprint, low-maintenance design and silent odor-free operation.

J8 Series 3D Printers

Brilliant designs shouldn't have limitations. Realize and elevate your ideas more quickly and precisely with Stratasys® J826™, J835™ and J850™ 3D printers — designed for all who design.

- Pantone Matching System (PMS) Colors,
- Multiple material selections means you can load up to seven materials at once.
- Double the number of print nozzles in print heads means you can produce ultra-smooth surfaces and fine details.

New Printing Technologies

Origin One

A transformative 3D printer enabling mass production of end-use parts in a diverse range of high-performance materials.

Stratasys H350

Tailor your production to suit your needs. Adjust powder mixes and re-use unfused powder to monitor material costs.

Neo® Stereolithography

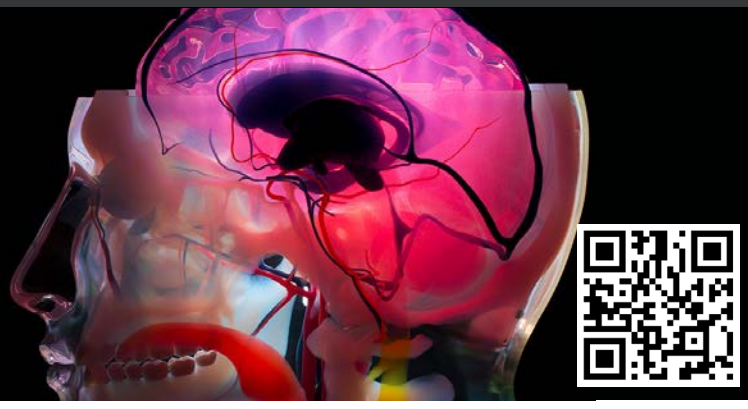
The **Neo800** builds large prototypes, rapid tooling and master patterns, and is the global market leader of large-format stereolithography technology.

Reliable, productive and efficient, the **Neo450** series is designed and engineered for industrial-grade performance.

3D Printers: *FDM*

3D Printing in Healthcare

We offer 3D printing solutions for educators to develop clinically relevant, high-impact training models from real human anatomy. These models reduce limitations by allowing universities to train physicians in any environment, and closely simulate real human tissue properties without using highly processed cadavers and animals.



FDM Technology uses the same tried and tested thermoplastics found in traditional manufacturing processes. For applications that demand tight tolerances, toughness and environmental stability - or specialized properties like electrostatic dissipation, translucence, biocompatibility, VO flammability or FST ratings - there's an FDM thermoplastic that can deliver.

Benefits of FDM Technology:

- Clean, simple-to-use and office-friendly
- Supported production-grade thermoplastics are mechanically and environmentally stable
- Printing complex geometries and cavities becomes practical

F 123 Series

F123 printers combine industrial-grade capability with simple operation. Requiring no special expertise, these printers offer carbon fiber 3D printing, fast and easy material swaps and auto-calibration for accurate, dependable results.

F450mc

The Fortus 450mc sets a high bar for speed, performance and accuracy in a variety of processes and applications including functional prototypes, manufacturing tools and end use parts.

F900

The F900 has the largest build size of any FDM system and can handle the most demanding manufacturing needs.

F770

Print large parts up to a meter long with an affordable, large-format 3D printer. The F770 delivers spacious build capacity in a user friendly platform with the reliability and consistency of Stratasys FDM technology.

RENISHAW
apply innovation™

RenAM 500Q

Quad Laser AM System for High Productivity

The RenAM 500Q features four high-power 500 W lasers. Each can simultaneously access the whole powder bed surface to achieve higher build rates, vastly improving productivity and lowering cost per part. The RenAM 500Q features automated powder and waste handling systems that enable consistent process quality, reduce operator intervention time and ensure high system safety standards.

Reduced Build Volume (RBV)

The RBV is designed for users to easily change between materials for material development and experimentation. All Renishaw AM systems feature open parameter editing with over 142 parameters. RBV enables rapid real time testing of the parameters, speeding up material development iterations.

Benefits

- Component weight reduction
- Rapid design iterations
- Bespoke or customized items
- Multiple parts consolidation
- Reduce tooling costs
- Build complex geometries
- Increased design freedom

QuantAM

File Preparation Software

Renishaw QuantAM is a dedicated file preparation software tool for Renishaw AM systems. With an intuitive workflow and easy navigation QuantAM accepts CAD exports in the form of .STL data and allows you to prepare your model for the AM process.

Freemelt ONE

The 3D Printer made for materials research and development.

Freemelt ONE is designed to make materials not yet known to mankind. Materials that engineers dream about. Materials that give us lighter, stronger and more efficient products.

- Use high beam power melting and fully open beam path sequencing
- Create your own IP with total control in the open architecture
- Develop new materials optimized for your application
- Develop faster processes and use a broader range of metal powders
- Knowledge and data shared in an open community
- Tailor the system to your needs with the open system architecture

freemelt

Artec 3D

Artec 3D scanners
Fast. Smart. Vital.

Streamlining engineering, industrial manufacturing, healthcare, science and education, with high precision, easy-to-use 3D technology.

Professional 3D Scanners

Our portable 3D scanners are engineered to easily be used by both experienced and first-time users, with expert guidance available during every stage of capture and post-processing. Advanced tracking ensures the best data capture possible and eliminates the need for using targets, which is a great time saver.

Artec Eva

The most affordable hand-held 3D scanner for professional results. A good option for medical applications and creating customized healthcare solutions.

- Highly-accurate results
- Light, portable and safe to use
- Geometry only tracking and data capture

Artec Space Spider

High precision, portable metrological 3D scanning solution based on blue-light technology, perfect for capturing small objects with intricate details, such as a cylinder head, coins or a human ear.

- Up to 0.1 mm 3D resolution and up to 0.05 mm 3D accuracy
- Fast capturing speed and no need for targets

Artec Leo

Our fastest professional hand-held 3D scanner yet. Encompassing the latest technologies in data capture, transfer and processing, this untethered 3D solution will revolutionize your workflow.

- Real time on-screen 3D model projection and processing
- Wireless technology with an inbuilt touch screen and battery

Laser Cutting & Engraving Machines

UNIVERSAL® LASER SYSTEMS

Global customers use ULS Digital Laser Material Processing (DLMP™) in various markets, including education, manufacturing, engineering, design and architecture. Universal Laser Systems' wide range of modular components can be configured into more than one million different laser system configurations, giving you the ultimate flexibility to build the best solution to meet your needs.

ULS dual laser platforms provide more than 100 laser power combinations giving you unmatched system flexibility: Complete laser material processing ecosystem by design.

Key Benefits

- Modular architecture
- Rapid Reconfiguration TM
- Dual laser platforms
- Air-cooled lasers from 10 W to 500 W
- SuperSpeed™
- MultiWave Hybrid™ technology
- Class one to four transformable platforms
- Integrated air purification systems
- Fire suppression
- Laser Materials Processing Database
- Advanced Process Control Software
- And more...

Fume Extraction

BOFA offers a wide range of fume extraction systems for the Laser, Mechanical Engineering, Electronics, Printing, 3D Printing, Dental, Pharmaceutical and Beauty applications.

BOFA™

THE WORLD LEADER IN
FUME EXTRACTION TECHNOLOGY

Innovation Solutions

Today's technology is advancing at an incredible rate. To be competitive in today's job market your students need to learn on the latest technologies they will encounter throughout their careers.

National Certifications for Robotics and Advanced Automation Manufacturing

FANUC Certified Robot Operator Certifications

Students with this level have a basic understanding of robot operations and programming, material handling and its components along with introduction to Roboguide simulation software. These certification programs are focused on the core Robot Operator skills needed by entry level or incumbent workers.

FCR-O1 FANUC Certified Robot Operator-1

Written assessment for an entry level position as a robotics associate in manufacturing. The assessment exams allow the candidate to demonstrate their knowledge in: Robot operations, frame setup, writing, modifying and executing basic motion programs, program offsets, backups and restorations, creating and modifying simulations.

FCR-O2 FANUC Certified Robot Operator-2

Performance assessment for an entry level position as a robotics associate in manufacturing. The performance exams allow the candidate to demonstrate their hands-on skills in: Robot operations, frame setup, writing, modifying and executing basic motion programs, program offsets, backups and restorations, creating and modifying simulations.

FANUC Certified Robot Technician Certifications

Students with this level have a more advanced understanding of robot operations and programming, material handling techniques, technical system components, and 2D integrated robot vision guidance and part inspection process, as well as Roboguide simulation software skills required for Robotic Technicians to enter automation manufacturing, production operations,and robotic systems engineering.

FCR-T1 FANUC Certified Robot Technician-1

Written assessment for technical level position as a robotics engineering associate in manufacturing. The assessment exams allow the candidate to demonstrate their knowledge in: Single axis mastering on all six axis, how to create and execute a pick and place program for load and unload applications, and how to set up and program 2D Integrated Vision for part offset and inspection,

FCR-T2 FANUC Certified Robot Technician-2

Performance assessment for technical level position as a robotics engineering associate in manufacturing. The assessment exams allow the candidate to demonstrate their skills in: Single axis mastering on all six axis, how to create and execute a pick and place program for load and unload applications, and how to set up and program 2D Integrated Vision for part offset and inspection.

Connected Smart Manufacturing Training System (CSM™)

Certifications, Curriculum and Software

- Integrated industrial production line
- Industry 4.0 IIoT
- FANUC & Rockwell integration
  - Part traceability and marking
  - Safety PLC
  - Safety area scan
  - Assembly station
  - Fault detection
  - Vision
  - Conveyors

Features

- FANUC LR Mate 200iD/7L robotic machine tender to load and unload the CNC vertical machining center
- Automated manufacturing work holder for CNC machining center
- Vision inspection of machining operation
- Laser etching of machined part blank for custom logo
- Vision inspection of etching
- Vision guided picking and sorting at assembly and packaging
- Packaging of complete kit in logo printed box in choice of colors
- Advanced PLC to robot control
- Rockwell Logix 5000 series PLC programming
- Fault insertion for system training
- Rockwell HMI PanelView interface touch screens
- Fenceless robot cells with safety area scan
- Smart sensor technology over Balluff 1/0 Link with diagnostics
- Project based mechatronics at each operation
- Dual purpose EOAT on robots with vacuum and mechanical gripping
- Conveyors with VFD variable speed drives
- RFID manufacturing process tracking
- Modular robot work cells that can be used independently
- Materials included for all manufacturing

Training Areas:

- PLC
- Robot
- Vision
- Safety
- IIoT
- Pneumatics
- Vacuum
- Motors
- VFD
- Laser
- Machining
- CNC programming
- Process Engineering
- Manufacturing

Training Levels:

I, II, III and Mechatronics

FANUC's CNC Certified Education Training Program

With over 2.4 million systems installed, FANUC is the undeniable global leader in CNC controls. They provide their customers with the most innovative, reliable and high performance products, backed by world-class service and support.

FANUC realizes it takes qualified machinists, programmers and operators to maximize productivity. To meet this need, FANUC has developed the most robust CNC certified education training program in the industry. If you want to train students to be productive employees right out of the gate, upgrade your educational programs with FANUC Certified Education Training.

powered by:

LEVIL TECHNOLOGY CORP

FANUC CNC Certification Cart

Tabletop CNC certification carts are portable machines with a FANUC CNC, so students can practice machine set up and operation, and bring their programs into reality by making parts. The certification carts can be easily moved since they fit through a standard doorway and use a standard wall outlet for power.

Carts are available in turning (lathe) configuration or machining (mill) configuration with optional tooling packages that correspond with the lab exercises in the FANUC education curriculum.

FANUC'S ROBODRILL

The versatile FANUC ROBODRILL can be used in many different fields. The high reliability and the long life of the ROBODRILL are guaranteed due to the robust and uncomplicated construction of the machine.

Due to the high speed cutting with FANUC 31i-B series of controls it is very easy to quickly machine precision parts with high accuracy. Because of the stiff machine construction, the ROBODRILL provides efficient and accurate machining operations like face milling, end milling and drilling.

Benefits of the ROBODRILL:

- Fast and reliable tool change mechanism
- Tool change time 1.6s chip to chip
- Revolving Turret with up to 21 tools
- Latest FANUC servo motor technology
- .004mm bi-directional repeatability

The 10.4" screen, quick screen and the full keyboard make it possible to input data with minimal time and effort. An additional standard PCMCIA card slot is located next to the screen and makes it simple to use CF cards.

Acceleration and deceleration will be optimized as the control will read 30 blocks ahead in the AICCII mode. In this way the part can be machine extremely fast and precise.

Introducing the New Standard for Speed, Precision and Productivity

FANUC's new SCARA robots are ideal for high-speed, precision applications such as assembly, pick and place, testing/inspection and packaging processes.

FANUC APT MANUFACTURINGsolutions

Robotic Welding Trainer

ArcMate Cart Features:

- Tinted sides to protect classroom (helmet required)
- FANUC Arc Mate 50iD/7L
- FANUC R30iB Mate plus controller
- Robot work area guarded for student safety

FANUC ARC CERT (ArcMate Only)

- FANUC ARC CERT Gift in Kind Package for qualified schools
- FANUC Advanced Academic Software/ARC Bundle
- FANUC ARCTool Student Certificate Program

APT MANUFACTURINGsolutions

Miller

CRX Cart Features:

- Fenceless (helmet required)
- FANUC CRX 10iA
- FANUC R30iB Mate mini plus controller

Both versions Include:

- Welded construction
- Fully integrated collapsible mobile cart design that fits through standard 36" door
- Miller Welding Power Supply Program

Optional Miller all-in-one manual to robotic MIG wire weld gun designed for versatility and ease-of-use.

PLC/HMI Trainer

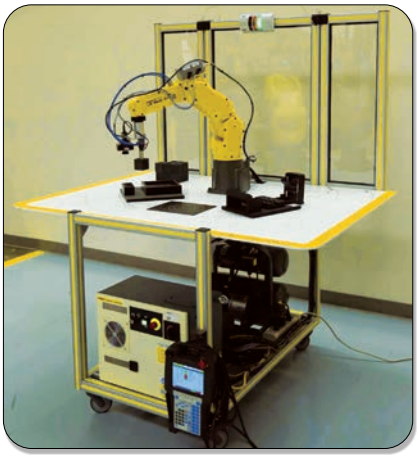
Pathway to CSM™ *Connected Smart Factory*

Rockwell Automation (Allen Bradley) CompactLogix control panel electrical project kit.

*Ready to use as a standalone OR integrate into any FANUC cart.

FANUC *Certified Education Robot Training*

Fanuc's Robotics' Certified Education Robot Training or (CERT) program certifies instructors at high schools, trade schools, community colleges and other universities to train their students to program Fanuc robots through on-line and hands-on training courses using actual Fanuc Industrial Robots. This creates a tremendous opportunity for schools to expand their training to include a certification on a real, industrial robot from the number one robot manufacturer in the world!



FANUC LR Mate 200iD/4S Fenceless CERT Cart

CERT Program Features and Options

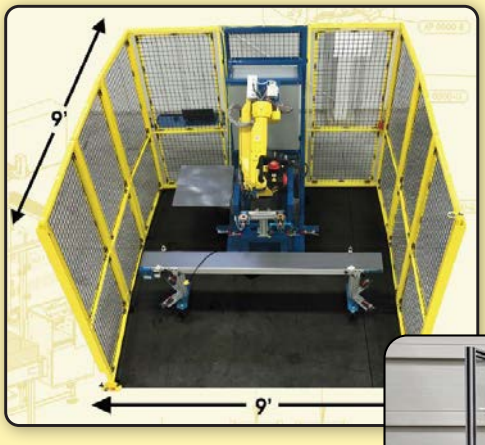
FANUC's CERT carts are compact, portable, self-contained educational robotic labs used to train students how to program an industrial robot in a safe and controlled environment (optional table-top mounting available).

The CR-35iA, the first-ever force limited Collaborative Robot from FANUC, combines unrivaled strength with outstanding safety to make interactive robot/human collaboration possible for a much wider range of applications. This is the only Collaborative Robot in the world that can lift heavy objects, up to 35 kg.

FANUC CR-4iA R-30iB Plus Collaborative CERT Cart

Advanced Manufacturing CERT Cell

Partnering with FANUC to bring education the first collapsible fully integrated advanced automation cell. The AM Cert is the next level of training once the student has grasped the concepts of handling tool operation, vision and DCS that is offered through the fenced, fenceless or Cobot CERT solutions from FANUC. Buy as is or customize to suite your particular requirements!



Machine Tending Education Cell Simulator

The MTEC-SIM is a compact, budget friendly version of the MTEC and teaches programming of a robot to CNC machine tool in a simulated environment. This machine comes ready for mill and lathe operation with the robot moving a blank from a pick location to a simulated mill vice or lathe chuck in one compact cell.

APT MANUFACTURINGsolutions

The TecSolutions Difference

For new construction and renovation projects, TecSolutions combines a clear vision of your goals with our professional consulting, planning, implementation and support services, to maximize your results:

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Before the space planning begins, our staff will meet with you to understand your objectives and help to define a successful and sustainable program implementation.

Planning

Next, we will assist in the careful planning of a total learning environment – not just a "lab." We'll work with your team and architects to help layout your space and provide you with detailed lab drawings and product specifications.

Implementation

When your building is ready, our factory-trained technicians will complete your furniture and equipment installation on time and within budget. Our manufacturing partners will provide effective professional development for your faculty and lab support staff, either on-site or at our training facilities.

Support

Once your program is up-and-running, our team of outside service technicians and inside support staff will work with you to ensure that your program continues to function as specified and is kept up-to-date, for many years to come.

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