



# Career & Technical Education

Solutions Guide

2017-2018



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Technical Laboratory Systems, Inc. was founded by Tim and Dede Brown in 1977 in order to meet the growing need for technical and vocational training. Over the last 37 years we have developed into a full service educational equipment and instructional software provider.

Through our network of manufacturing partners, we provide the most up-to-date curriculum resources, software, equipment, furniture, professional development and customer support available today, for a wide range of STEM and Career and Technical Education areas.

Tech-Labs exists to equip schools, colleges, universities and companies with technology enabled training solutions that empower individual learners to create a better life for themselves and their families, and enables American companies to increase their competitiveness in the global economy by providing solutions to train a highly-skilled workforce.

**Technical Laboratory Systems, Inc.**

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# Table of Contents

 Agriculture, Food & Natural Resources.....	4
 Architecture & Construction.....	8
 Arts, A/V Technology & Communications.....	12
 Health Science.....	13
 Information Technology.....	15
 Manufacturing & Engineering.....	16
 Science, Technology, Engineering & Mathematics.....	32
 Transportation, Distribution & Logistics.....	39

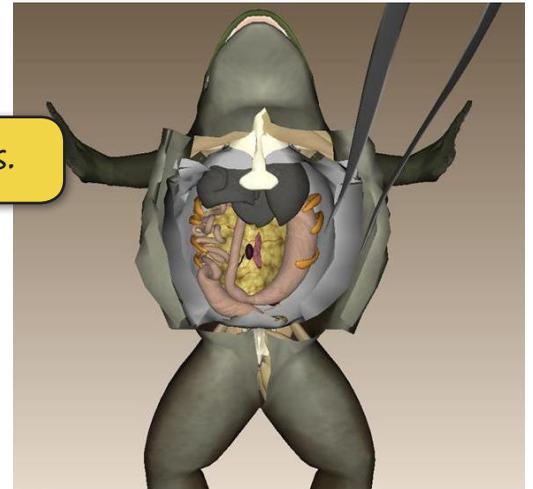


## **AVRover** Animal Science

*The best educational tool you can provide your students.*

### **Capture the minds & imaginations of your students with 3D**

The 3D AVRover integrates the best in hardware, software, and content for a truly remarkable 3D learning experience. Proven to increase test scores and retention by as much as 33%\*, the 3D AVRover is certain to inspire students and enhance lessons. Also serves as a great recruiting tool for schools. Parents love it!



### **Complete Solution**

The 3D AVRover includes a 3D DLP Projector, 3D Computer with 3D Content, 3 built in speakers, mixer amplifier with microphone input as well as XLR out, laptop connections, 2 locking storage drawers, retractable power cord, heavy duty casters, and much more.

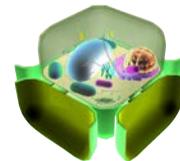
### **Easy to Use**

Bringing lessons to life is easy with the 3D AVRover. Simply plug your system in, turn it on, and you have the highest quality 3D videos, interactive objects, and virtual simulations for your whole class to enjoy.

"As a district, we have purchased over 600 rover carts from AVRover. We love the carts and the flexibility an AVRover cart provides for classrooms. Working with AVRover has been easy and seamless. Their response to our needs is quick and professional and the quality of their product is solid. I would recommend AVRover for any cart needs. The teachers of Bellevue Public Schools absolutely love their carts and would not be able to function effectively in the classroom without them."

Greg Botteger  
Director of Technology  
Bellevue Public Schools

*Teach where you want,  
the way you want.*



For more information  
see page 12.

## **PolyJet 3D Printers**

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**

PolyJet technology offers exceptional detail, surface smoothness and precision.

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





## Renewable Energy

### Green Energy Technology

One of Amatrol's newest programs is our Green Energy Technology (GET) program. This program starts with many traditional technical disciplines like electric motor control, wiring, rotation machines, hydraulics, mechanical fabrication, print reading, etc. and moves into more specialized skills in wind turbine and solar thermal concepts and installation.

### Solar Technology

The future of solar energy is strong with increasing demand for qualified technicians. Solar Technicians require specialized job skills, combining electrical and plumbing skills with solar technology savvy. They face unique challenges in bringing solar technology to commercial and residential applications. Amatrol's Solar technology program allows students to build the knowledge they need as well as develop the hands-on skills required. Successful Solar Technicians incorporate many traditional technical disciplines like electric motor control, wiring, rotating machines, piping, pumps, power distribution, etc. along with more specialized skills in solar technologies like solar installation, PV and thermal system troubleshooting, and specialized solar piping and pumps.

In addition to solar energy technicians, this program serves as a valuable career resource for solar engineers, solar installation professionals, solar consultants, and solar installers.

### Wind Turbine Technology

Wind Turbine Technicians are in demand – with few to be found. They are uniquely skilled, handling a wide breadth of operational and maintenance issues, frequently while a hundred meters in the air. The job skills they require incorporate many traditional technical disciplines like electric motor control, wiring, rotating machines, hydraulics, mechanical drives, networks, etc., along with more specialized skills in wind turbine nacelles, hubs, and turbine generator control units.

Amatrol's Wind Turbine Technology program prepares students to confidently assess and remedy the many challenges they will face on-the-job. Troubleshooting and problem solving across all the technologies required for Wind Turbine Technicians are keystones for Amatrol's Wind Turbine Technology program. In addition to wind turbine technicians, Amatrol's Wind Turbine Technology program is also a valuable career building block for wind turbine engineers, wind techs, and wind turbine site supervisors.



## Teach Job-Ready Skills Hands-On!



## Weld Training Solutions

**Lincoln Electric offers the welding instructor and educator the right tools to bridge the manufacturing skills gap.**



Lincoln Electric is the world leader in the design, development and manufacture of arc welding products. In addition to being the industry standard for welding equipment and supplies, Lincoln Electric also develops and supplies Welding Training Simulators and supplies. We are proud to represent Lincoln's line of educational Welding Simulators and is your Authorized Educational Reseller.

### VRTEX® Engage™ Virtual Welding Trainer

This standalone system, designed to introduce basic skill trades to students in non-traditional academic settings, gives users a taste of the more advance VRTEX system designed specifically for welding training.

### VRTEX® Mobile Virtual Welding Trainer

The VRTEX® Mobile is a basic, entry level welding training system designed to provide mobility in an easy to use and engaging welding training tool. The VRTEX® Mobile is ideal for initial, basic welding training, as a recruitment and engagement tool or as an evaluation tool for instructors and educators.

### VRTEX® 360 Virtual Reality Arc Welding Trainer

The VRTEX 360 is a best-in-class, advanced level welding training system. It is designed to provide a full featured, expandable platform in an easy to use and engaging welding training tool.

### REALWELD® Trainers

With the REALWELD® Trainer in your welding booth, students can practice Stick, MIG and Flux-Cored arc welding, while receiving audio coaching and weld performance tracking on 5 key parameters. It's like having a teacher's assistant right in the booth helping to advance every student toward their career goals.



For more information on the welding training products available, see page 26.

**TEACH  
YOUR  
TRADE**

**WE'LL DO THE REST.**

*Sign-up for a  
FREE  
30 Day Trial!*

[tech-labs.com/ulinc](http://tech-labs.com/ulinc)

**U/LINC**  
Welding Curriculum  
by Lincoln Electric



## HVAC Technology

Amatrol offers an array of HVAC Industry Learning Systems that enable students to develop technical skills in all areas of HVAC Industry technology.

The challenges faced by the HVAC Industry are many and varied, requiring workers to comprehend and apply a wide knowledge breadth across many areas. The demand for knowledgeable HVAC Industry workers is high and foretasted to remain strong. New workers must be able to successfully interact with increasingly sophisticated systems as the HVAC Industry transforms to meet new, sophisticated market demands.

Amatrol combines basic knowledge with applied, hands-on skills to enable learners to develop the skills needed in modern HVAC Industry. Amatrol's HVAC Industry Learning Systems are comprehensive, offering strong curriculum, equipment and multi-media to help instructors create those teachable moments where students grasp HVAC Industry concepts and how to really work with them.



### HVAC Categories

- Electrical
- Electronics
- Fluid Power
- Mechanical
- Process Control
- Thermal



## HVAC Technology Learning Systems

Amatrol's series of Thermal Systems Training units provide comprehensive coverage and content in the areas of Thermal Science, Heat Pump Technology, Heat Pump troubleshooting, and Heat Pump Applications. Each of these programs include hands-on exercises on State-of-the-art training systems using real world components. Each topic area has curriculum supported by print material and exciting interactive multimedia spanning basics through advanced topics and troubleshooting.

### Geothermal Systems

Geothermal systems are becoming very popular as an alternative energy source and the need for trained technicians is increasing rapidly. This system teaches the basics as well as advanced troubleshooting techniques in a systematic approach.



### Steam Learning Systems

Amatrol's Steam Learning system introduces students to the operation, installation, maintenance and repair of steam systems and their application in commercial and residential as well as industrial settings. The curriculum covers a range of steam system topics such as how to operate a boiler and theoretical knowledge like the coefficient of volume and thermal expansion.

In addition to learning systems geared toward post-secondary and industrial customers, Amatrol also offers systems **specifically designed for high schools**. One of the biggest challenges facing the workforce today is a skilled worker shortage. Because of this, Amatrol is dedicated to providing high schools with learning solutions that will cover applicable STEM knowledge and advanced manufacturing topics and skills.



## HVAC Technology

iConnect Training has been producing the finest HVAC/R training units for education for over 30 years. They can be found in high schools, Career Centers, Community Colleges and Industry Training Centers worldwide. The series of HVAC training units includes everything from basic heating and cooling training systems to “Build Up” trainers and Technician Equipment packages.



### Training Units:

- TU-503 Electric Motor Technology Center
- TUE-200 Residential Wiring Demonstrator
- TUE-150 Residential Wiring Trainer
- TU-306 Refrigeration Diagnostic Center
- TU-406 Residential Heat Pump Trainer
- TU-420 Fundamentals Of Refrigeration Trainer
- TU-100 Basic Refrigeration Trainer
- TU-105 Commercial Refrigeration Trainer
- TU-155 Industrial Refrigeration Trainer
- TU-206 Residential Air Conditioning Trainer
- TU-406 Residential Heat Pump Trainer
- TU-208 Forced Air & Hydronic Heating Trainer
- TU-701 Tabletop Heat Pump Trainer
- TU-103 Automotive Air Conditioning Trainer
- TU-502 Gas Fired Heating Control Board
- TU-129 Oil Fired Heating Control Board
- TU-302 Electric Heating Control Board
- TU-521 Single Phase Compressor Control Board
- TU-501 Motors, Controls & Circuits Build-Up Trainer
- TU-101 Domestic Refrigeration Build-Up Trainer
- TUE-100 Electronic Wiring Skill Package

### iManifold by iConnect Training

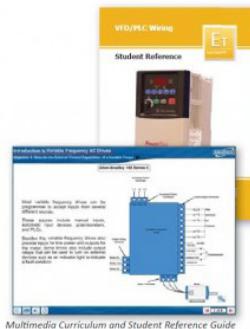
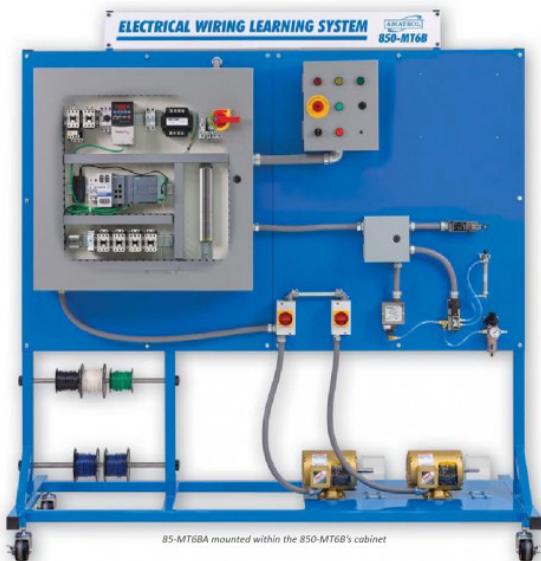


The smart device displays system pressures, temperatures, superheat and subcooling while simultaneously calculating performance targets. The iConnect iManifold application technology eliminates the need for manual calculations, analyzes system data, troubleshoots system problems, and generates our exclusive VeriFi™ by iConnect performance reports.



**iConnect**  
TRAINING

## Residential Wiring



### Learning Topics

- Introduction to Electrical Control Wiring
- Electrical Control System Wiring
- Pneumatic Control Circuit Wiring
- Electrical Prints
- Electric Panels
- Wiring Between Panels
- Wire Color Coding
- Wiring Between and Outside Panels
- Wire Bundling
- Electro-Pneumatic Valves
- Pneumatic Schematics
- Electro-Pneumatic System Installation

Amatrol's Industrial Electrical Wiring Learning System (85-MT6) introduces learners to the basics of electrical wiring, such as wire termination, wire sizing, conduit sizing, terminal block installation, and wire splicing, as well as how to read and create electrical prints.

### Key Features

- Industrial Standard Components
- Heavy Duty Welded Steel Workstation
- Industrial Standard Wiring
- Double-Sided Workstation
- Multimedia Curriculum Available

### Multimedia Curriculum Available

Amatrol's unmatched multimedia utilizes text, audio, and stunning 3D animations that engage learners in both theoretical knowledge and hands-on skills.

### Student Reference Guide

A sample copy of this course's Student Reference Guide is included with the learning system.

### Related Electrical Products

- AC Electric Motors Control Systems and Training
- AC/DC Electrical Learning System - T7017A
- Electric Relay Control Unit - 90-EC1A
- Electrical Fabrication 1 Learning System - 950-ELF1
- Electrical Power Distribution Learning System - 85-MT7-B
- Electrical Wiring Training System - 850-MT6B
- Industrial Electrical Wiring Learning System - 85-MT6
- Industrial Wiring Schematic & Installation Training System
- Portable AC/DC Electrical Learning System - 990-ACDC1
- Portable Electric Relay Control Learning System - 990-EC1





## Residential Wiring



### TUE-200 Residential Wiring Demonstrator

Students gain a full understanding of National Electrical Code residential electrical circuits. Through actual practice, students attain a substantial beginning level skill and proficiency using tools of the electrical trade.

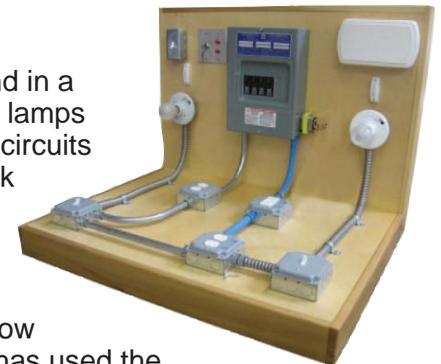


#### Typical Wiring Jobs Include

- 2 & 3-way switches
- Lights controlled from 1 or more locations
- Central distribution with circuit breakers
- EMT conduit, romex and greenfield wiring
- Old and new work practices
- In-wall and surface mounted wiring devices
- Low voltage signaling devices, 120 and 240V AC, 3-wire Edison wiring
- Control and installation-fluorescent lighting
- Control and installation-incandescent lighting
- Shipped in 2 sections (each 64" x 84", 500 lbs.)

### TUE-150 Residential Wiring Trainer

This Trainer Panel is used to demonstrate electrical principles similar to those found in a residential dwelling. It also has provision for extensive switching and connection of lamps and outlets. The trainer has a 24 volt power supply that is used to wire and test all circuits. After the instructor has approved wiring, 115 VAC can be applied using the key-lock circuit breaker control. The ability to use low voltage for testing and 115 VAC for final wiring is a valuable teaching aid.



The inclusion of the dual 24 VAC power supply makes this a very useful trainer for introductory classes, since all initial breadboarding and testing can be done at low voltage and then 115 VAC is only made available to the trainer after the instructor has used the key to turn on the Electro-Lock to apply 115 VAC. Students learn wiring as well as the proper electrical hookups from the manual that is included. All of the above components are mounted on a hardwood panel.

## Laser Cutting, Engraving, and Marking Machines and Equipment

- Complete laser material processing ecosystem by design
- Modular architecture
- Rapid Reconfiguration™
- Air-cooled lasers from 10W to 500W
- SuperSpeed™
- MultiWave Hybrid™ technology
- Class 1 to Class 4 transformable platforms
- Integrated Air Filtration Systems
- Fire suppression
- Laser Materials Processing Database
- Advanced Process Control Software
- And more...

For more information, see page 37.





## Smart Home Technologies



### Residential Electronics Systems Integrator {RESI}

Teach your students to install and interconnect residential electronic communications, computer, control and entertainment equipment. Our expert training systems are the perfect addition to your construction or electronics program.



### Smart Home Certifications

#### Electronic Technicians Association (ETA) Residential Electronics Systems Integrator

Basic Residential Electronics Systems Integrator

#### Electronic Technicians Association (ETA) Audio-Video Endorsement

RESI Audio-Video Endorsement

#### Electronic Technicians Association (ETA) Security-Surveillance Endorsement

RESI Security-Surveillance Endorsement

#### Electronic Technicians Association (ETA) Data Cabling Installer

Low Voltage Wiring Certification Program

MECP Basic Installer Certification Program

#### Electronic Technicians Association (ETA): Certified Alarm Security Technician

Security-Surveillance Certification Program

#### Electronic Technicians Association (ETA): Fiber Optic Installer

Fiber Optic Installer Certification Program

#### Consumer Electronics Association: Mobile Electronics Certified Professional Certification



### Renewable Energy/Energy Efficiency Certifications

#### NABCEP PV Installer, Entry Level

Solar/PV Installer

#### Electronic Technicians Association (ETA) Solar/PV Installer

Solar/PV Installer Training Guide

#### Electronic Technicians Association (ETA) Small Wind Installer

Wind Turbine Technician Training Guide

#### RESNET Rater/Auditor

Energy Auditing



## AVRover

AVRover systems are being used in over 1,200 schools throughout the US.

AVRover has the largest library of 3D educational content. Some of our educational content includes:

### Animations

A unique blend of 3D videos, simulations, experiments, learning activities, quizzes, texts, images, and learning objects, our 3D Animations have revolutionized the way students understand key concepts in Math and Science.

### Interactive Objects

3D interactive objects include incredibly detailed, interactive models spanning the subjects of Botany, Human Anatomy, Zoology, Microbiology, Chemistry and Engineering. Students can explore, dissect and manipulate virtual 3D objects.



"In order to truly integrate technology into our curriculum, we are modifying our computer lab philosophy to the following...bring the technology to the student, instead of the student to the technology. We will accomplish this by outfitting our computer teacher with a complete AVRover SVS200 system from which to conduct her scheduled computer class right in the classroom. Our ultimate goal will be for collaboration around designing integrative lesson plans and shared teaching between the classroom teacher and the computer teacher."

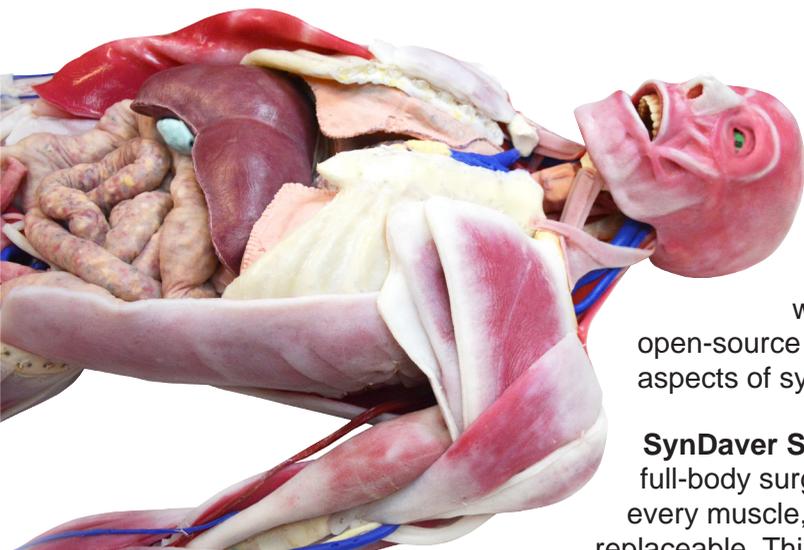
-Milton, NH Technology Director

## Teach where you want, the way you want

- Most Comprehensive 3D Library
- Advanced 3D Computer System
- Professional sound system
- Adjustable image size and height
- Totally secure even when in use
- Shareable between classrooms
- No setup time
- Great recruiting tool



# SynDaver™



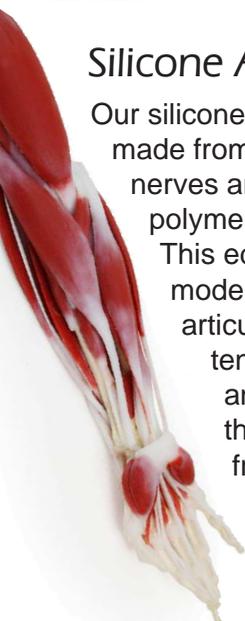
**SynDaver Anatomy Model:** an education-grade synthetic human cadaver complete with all bones, joints, muscles, organs and tendons.

**SynDaver Patient:** in addition to all of the existing features that have made the Synthetic Human world-famous, the SynDaver Patient also includes an open-source physiology engine that controls body motions and all aspects of synthetic biology.

**SynDaver Synthetic Human:** the most elaborate and sophisticated full-body surgical simulator ever devised. An exquisite 3D jigsaw puzzle; every muscle, bone, vascular component and organ is removable and replaceable. This is the apex of hands-on surgical simulation.

## Silicone Anatomy Arm

Our silicone anatomy arm is made from silicone (muscles, nerves and vasculature) and polymer composite (bones). This education-grade model includes bones, fully articulating joints, muscles, tendons, veins, arteries and nerves. Since the model is made from silicone and dry polymers wet storage is not required.



## SynAnatomy Wearable Chest Tube Trainer

A highly lifelike medical training simulator designed to teach users interested in developing skills associated with tube thoracostomy placement.



## SynDaver Surgical Model

The most elaborate full-body surgical simulator ever devised, featuring complete and functional musculoskeletal, cardiovascular, respiratory, gastrointestinal, endocrine and nervous systems based on CT, MRI and ultrasound images of actual patients.



## SynDaver Surgical Canine

The SynDaver Synthetic Canine is a futuristic animal model designed to replace live animals and animal cadavers in veterinary surgical training. Based on 20+ years of SynDaver research, this model is made from water, fiber and salt.

She is a life saver, but she is not alive. She breathes and bleeds just like a real dog. She has individual muscles, bones, and organs – and can be operated on repeatedly without risking a live animal.

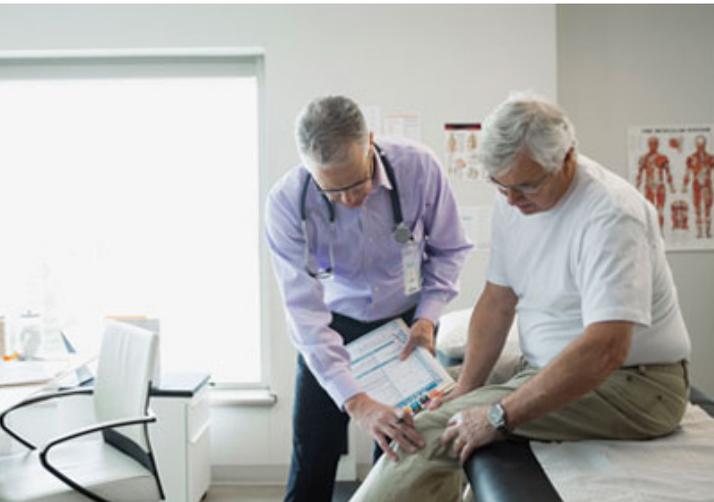


Validate device performance on patient-derived 3D printed anatomical models versus existing models such as animals and cadavers. Based on real patient imaging, 3D printed models mimic a variety of tissue properties in a single print. Stratasys Medical 3D Printing Solutions can help you accelerate product development from 3D printed concept models to preclinical testing allowing manufacturers to gain certainty, test anywhere, and mitigate cost overruns.



“My team could visualize the operation before we started. We knew the safest approach, and confidently made a smaller incision.”

Dr. Redmond Burke, Nicklaus Children’s Hospital



## 3D Printing in Medicine

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.



# AVRover

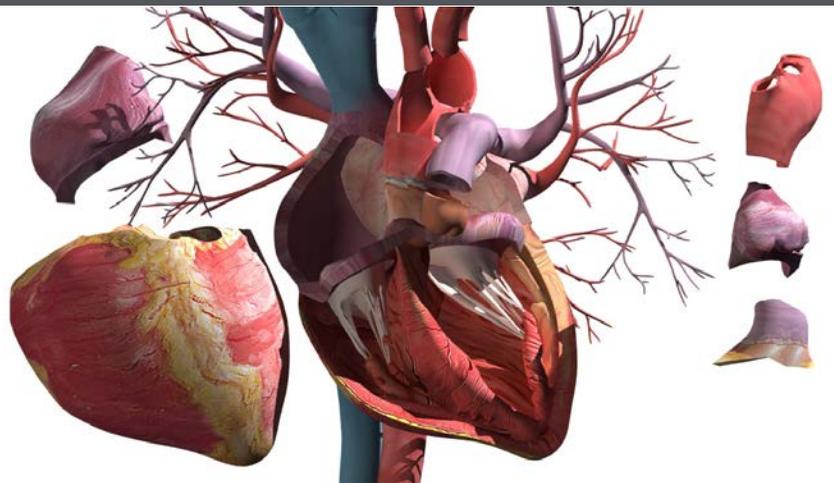
## Cyber Anatomy

Cyber Anatomy 3D offers the highest level of personal immersion, learning, and interactivity. This turnkey solution provides an extraordinary experience.

### Discover Anatomy in a New Way!

Users interactively control all simulations and activities with an intuitive stylus. The system and selected content is turnkey and allows for fast setup and use. Cyber Anatomy 3D includes a full set of anatomy instruction materials developed in 3D.

For more information on AVRover, go to page 12.



## Cyber Security Skills are in high demand as threats continue to plague enterprises around the world.

In today's Global IT environment, CYBER SECURITY goes well beyond traditional network security.



Based on the National Institute of Standards Technology (NIST) - Cyber Security Frameworks, the new ETG/ Marcraft Cyber Security Essentials - Concepts and Practices course covers both theory and hands on labs:

- Critical Infrastructure Security Systems and Devices
- Intelligent Computing and Controlling Devices and Systems Security
- Business Information Technology (IT) Network Security Systems and Techniques
- Industrial/Utility Industrial Control System (ICS) Networks and Devices Security
- Medical Network and Data System Security
- Ethical Hacking Roles and Tools

The latest vendor-neutral A+ and Network+ Certification programs from CompTIA are the crucial first step in developing the knowledge, ability and skills currently demanded by the IT industry.

More than 400,000 students and technicians have relied on Marcraft for IT training and Certification exam preparation.

"In short, America's economic prosperity in the 21st century will depend on cyber security."

- THE WHITE HOUSE  
Office of the Press Secretary

### Prepare students to challenge ISACA Cybersecurity Fundamentals Certificate Exam!

#### IT Certifications

##### Microsoft Networking Fundamentals

MTA Exam 98-366  
Introduction to Networking

##### Microsoft Security Fundamentals

MTA Exam 98-367  
Introduction to Security  
Cyber Security Essentials

##### CompTIA A+ Certification

Maintaining and Repairing PC's

##### CompTIA Network+ Certification

Network+ Certification

##### ISACA Security Fundamentals Certificate

Cyber Security Essentials

##### CompTIA Healthcare IT Technician

Cyber Security Advanced Healthcare IT

##### CompTIA Security+

Cyber Security Essentials

##### Certified Ethical Hacker

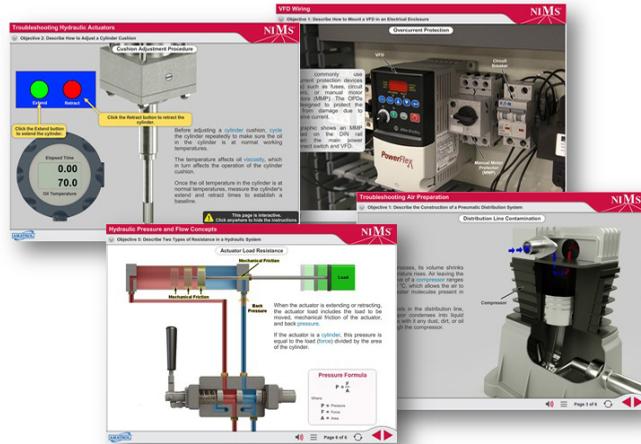
Hacking, Cracking and Internet Jacking  
(Advanced hacking)

##### CompTIA Advanced Security Practitioner (CASP)

Advanced Enterprise Security



"Few job categories can match the explosive growth in demand for cyber security talent." - CIO Journal



## Amatrol's NIMS Industrial Technology Maintenance Certification

NIMS, Lightweight Innovations for Tomorrow (LIFT) and Ivy Tech Community College are partnering to enhance and expand training to fill the largest number of open manufacturing jobs. The program is part of a comprehensive effort to prepare a new industrial technology maintenance workforce, which drives the performance and improvement of high-tech manufacturing, and has grown in demand by 118% from 2011 to 2015.

### The initiative will focus on building high-quality training programs by:

- Rolling out the first-ever industry standards for educating and training the industrial technology maintenance workforce
- Training instructors from community colleges across the entire region; and

Equipping a competent workforce with the knowledge, skills and credentials they need to enter into and advance in the field.

In order to address the critical need for skilled maintenance technicians, NIMS has created nine stackable certifications in Industrial Technology Maintenance (ITM).

### NIMS ITM Certifications are available in each of the following duty areas:

- Duty Area 1:** Maintenance Operations
- Duty Area 2:** Basic Mechanical Systems
- Duty Area 3:** Basic Hydraulic Systems
- Duty Area 4:** Basic Pneumatic Systems
- Duty Area 5:** Electrical Systems

- Duty Area 6:** Electronic Control Systems
- Duty Area 7:** Process Control Systems
- Duty Area 8:** Maintenance Welding
- Duty Area 9:** Maintenance Piping

**These stackable credentials enable students to learn and earn at the same time!**



NIMS (National Institute for Metalworking Skills) endorses Amatrol's Industrial Maintenance Certification Program. NIMS provides national standards for metalworking. Additional details on how to obtain a certification can be found at [Amatrol.com](http://Amatrol.com) or [NIMS-Skills.org](http://NIMS-Skills.org).



## High School Learning Programs



### Engage, Interact, Learn!

#### Skills-based learning programs that attract and retain high school learners

Engineering and technology offer some of the most rewarding career opportunities possible! Amatrol's high school programs are designed to engage students who demand a high degree of interactivity and challenge to keep them interested and learning. All of our high school programs articulate to colleges for up to 18 credit hours.

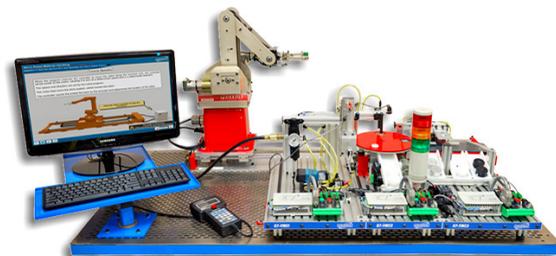
Amatrol's Pre-Engineering and Manufacturing programs are a great way to get high school students interested in exciting and rewarding careers. Hands-on experience in a wide range of engineering technologies using industrial quality equipment and software prepares them for success in college and beyond.

**Amatrol's learning design engages students at their own pace, allowing them to be successful in understanding and applying new technical knowledge. The programs work well in both self-directed as well as traditional classrooms.**

#### High School Learning Programs:

- Certified Production Technician
- Construction Technology
- Green Technology
- Pre-Engineering
- Project-Based Learning
- STEM
- Student Reference Guides
- Technology Education

Amatrol's High School programs use a unique blend of project-based team learning combined with a rotational individualized learning format for technical skills development. Amatrol offers both traditional equipment based labs as well as virtual labs. While designed for self-paced learning, Amatrol's learning programs are equally effective in traditional classroom settings. All of Amatrol's learning programs allow students to fully experience the rewards of hands-on, applied technical learning.





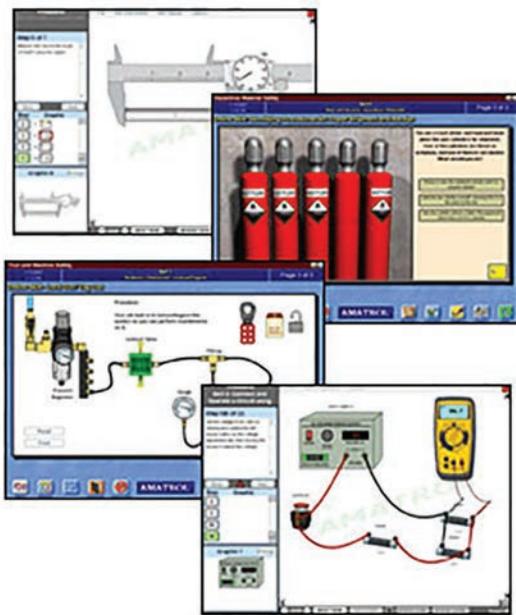
## Amatrol's Certified Production Technician Program



The Certified Production Technician (CPT) program enables students to build foundational skills such as engaging in their work, work effectively with others, identify and solve problems, and continue to acquire the necessary skills to succeed in their work roles.

The program's interactive multimedia curriculum uses a competency-based instructional design that teaches Manufacturing Skill Standards Council's (MSSC) nationally recognized standards. An engaging combination of video, text, audio, 3D animation and interactive activities, the CPT curriculum captures the attention of the student and keeps them engaged through the entire learning process – igniting their passion for achievement.

The MSSC CPT Program provides training and credentialing in the foundational areas of safety, quality, manufacturing processes and maintenance. In addition to technical skills, CPT addresses cross-functional skills, such as communication, teamwork, customer awareness and workplace conduct. CPT is the foundation of the NAM-Endorsed Skills Certification System, making it a truly portable credential.



### Amatrol Certified Production Program Flexible Turn-key program!

#### Amatrol's turn-key program includes:

- Four Certification Areas
  - Safety
  - Quality Practices & Measurement
  - Manufacturing Processes & Production
  - Maintenance Awareness
- 224 Industry/Career Skills
- 140+ Hours of Learning
- 39 Self-Paced Learning Units
- 25 Seats per Production Module



Certified Production Technician (CPT): The MSSC System awards certificates to individuals who pass any of its four Production modules: Safety; Quality Practices & Measurement; Manufacturing Processes & Production; and Maintenance Awareness and a full Certified Production Technician (CPT) Certification to those who pass all four.



## Industrial Maintenance & Mechatronics

Amatrol delivers total learning solutions for advanced manufacturing!



“Your Success is Our Success” is the philosophy and commitment to all of Amatrol’s customers. They provide total learning solutions for the ever growing critical problem of skill shortages in manufacturing. You will find that their many learning systems cover the full range of needed skills – from basics to advances across pretty much every technology used in industry today. Their focus is job ready and they provide the tools you need to make that happen.

### Key Features:

- Highly demanded industry skills: hands-on, job-ready
- Individualized self-paced or group learning flexibility
- Extensive curriculum spanning basics through advanced
- Authentic industrial troubleshooting
- Durable, industrial equipment designed for effective teaching
- Superior multimedia interactivity connects with learners
- eAssessment to accelerate learning and improve effectiveness
- Learning anywhere, anytime – 24 x 7
- Computer based training (CBT) with Amatrol’s eAssessment (available via the web)



### Multimedia

Genuinely interactive multimedia with vivid 3D graphics designed to teach as well as engage, checking for understanding and providing feedback- not the common quiz question so often claimed as “interactive.” Frequently includes virtual skills that allow students to perform the same activities in simulation they would with hands-on equipment. Available via the web or to own.

### Curriculum & Assessment

Comprehensive Curriculum For Individual Self-Paced or Group Learning Flexibility. Curriculum is, indeed, the key to learning. Great equipment alone is not enough. Excellent teaching materials is their promise and commitment to you.

#### Key Industry Skill Areas Integrated Into Amatrol’s Learning Solutions:

- Foundation Skills
- Problem Solving & Analysis
- Troubleshooting
- Operation
- Turning & Adjustment
- Installation
- Maintenance & Repair
- Application



## Advanced Manufacturing

### Electrical

- AC/DC Electrical
- Motor Controls & VFD's
- Power Distribution & Wiring



### Mechanical

- Mechanical Drives
- Vibration Analysis
- Laser Alignment



### Fluid Power

- Basic Hydraulics & Pneumatics
- Advanced Fluid Power and Troubleshooting



### Electronics

- AC/DC Drives
- Power & Control Systems
- Motion Control



### Automation

- Robotics
- PLC's
- Mechatronics





## Amatrol's NIMS CNC Operator Certification

CNC Machine Operator skills are required for over 500,000 manufacturing jobs. A CNC machine operator requires expertise in running CNC machines but is not a machinist. Unlike most CNC training programs available today, Amatrol's CNC Machine Operator Program has been designed in partnership with a large global manufacturer specifically for machine operators, streamlining and focusing on the skills these operators need.



### Amatrol's Turn-Key Program Includes:

- 24 self-paced learning units
- 132 skills, 80+ hours of learning
- Instructor's guide with authentic skill assessments (practice for NIMS certification)
- OJT (On-The-Job-Training) guide
- NIMS exam registrations(s): Flexible Delivery - via the web or server-based in the classroom
- Skill tracking and reporting software available
- Both FANUC and Haas Controls

### Rich Multimedia Featuring:

- Interactive Exercises
- Engaging graphics
- Vibrant 3-D Animations
- Extensive Videos
- Narration and Text
- Comprehensive Explanations



NIMS (National Institute for Metalworking Skills) endorses Amatrol's CNC Machine Operator Program exclusively as the recommended preparation method for the NIMS CNC Machine Operator Certification. NIMS provides national standards for metalworking. Additional details on how to obtain a certification can be found at [Amatrol.com](http://Amatrol.com) or [NIMS-Skills.org](http://NIMS-Skills.org).



## Available Portable Learning Systems:

- AC / DC Electrical
- Electrical Relay Control
- Pneumatics
- Precision Gauging
- Electronic Sensors
- PLC - Allen-Bradley
- PLC - Siemens S7-1200
- Motor Control
- AC Motor Drives

## Electronic Fault Insertion Available on the Following Portable Learning Systems:

- PLC - Allen Bradley
- PLC - Siemens
- Motor Control
- AC Motor Drives

## “Real” Portable Learning Systems

*Learning Systems Designed as Portable Systems*

Set up training in a classroom, shop floor, or practically anywhere.

Portable trainers fit easily in a car to transport to another facility.

Avoid the logistical hassles of trailer-based systems.

Quickly change over a classroom from one course to another.

Portable systems store in a closet and set up in minutes!

## Comprehensive Training

No Sacrifice for Portability



- Same knowledge and hands-on skill training as larger systems
- Industrial components ensure relevant skill transfer
- Ability to connect with other learning systems
- FaultPro - Electronic Fault Insertion Available on many models



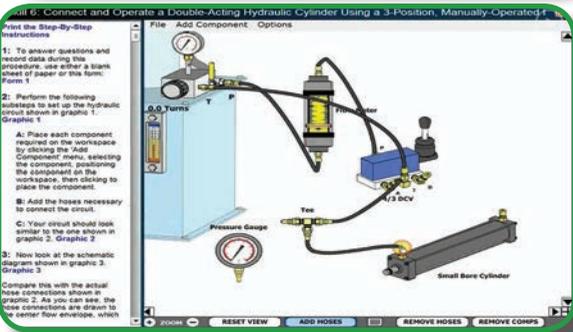
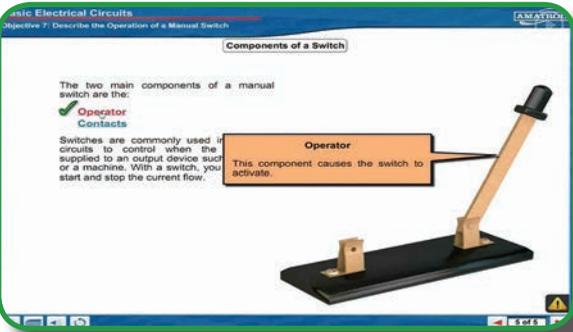
## NEW! Portable Hydraulics Training

Skill-Building for Basic Hydraulics Applications

- Gain skills by studying topics like basic hydraulic circuits, pressure control circuits, hydraulic schematics, and sequence valves
- Includes gauges, manifolds, cylinders, valves, flow meter, and hydraulic motor
- Includes schematic symbols for each component, creating the ability to read and draw their own hydraulic schematics



Go to [tech-labs.com/amatrol/new](http://tech-labs.com/amatrol/new) for more new products!



### Step 1 - Assess



### Step 2 - Get Results: red means did not pass

W-12116-XX-04 Assembly Drawings and Fasteners	Score
Objective 1: Describe the function of a fastener based on a print. 33%	33%
Objective 2: Describe the function of a file block. 67%	67%
Objective 3: Describe the function of a change block. 66%	66%
Objective 4: Describe the function of a surface tool. 66%	66%
Objective 5: Describe the function of a lathe tool. 67%	67%
Objective 6: Describe the function of the body of the drawing. 66%	66%
Objective 7: Describe the function of a drawing cone. 66%	66%
Objective 8: Describe how to determine the appropriate drawing scale. 66%	66%
Objective 9: Describe the function of a section line. 66%	66%
Objective 10: Describe the function of a section line and a cutting plane line. 66%	66%

### Step 3 - Go to training for items missed!



## Amatrol – e-Learning

### Interactive Technical Skill Development, Hands-On Virtual Simulators!

Amatrol’s e-Learning program meets the challenge for flexible technical training by offering superb technical content depth as well as breadth, strong interactivity for skill development, and excellent assessment and student tracking through an intuitive, easy-to-use web portal.

With 24 x 7 access, Amatrol’s e-Learning program creates easy access to educational opportunities for technical skill development previously restricted to the classroom. The material is self-paced, making it ideal for individual use, traditional class settings, or a blended approach. Amatrol’s proven curriculum is problem-solving oriented and teaches technical skills in a wide range of industrially-relevant technologies.

### e-Learning Training Topics:

- Quality • Robotics • Mechanical • PLCs
- Electrical • Fluid Power • Machining • Plastics

## Amatrol – e-Assessment

### Identify Skill Gaps for More Efficient Training

Amatrol’s eAssessment revolutionizes technical assessment and training by individually determining a learner’s skill level in specific areas. This assessment prevents training overlap, which dramatically improves training effectiveness and reduces invested time and cost.

### Assessments Available In:

- Automation • Electrical • Fluid Power • Green Energy
- Industry Fundamentals • Lean Manufacturing
- Machining • Manufacturing Processes • Materials
- Measurement & Gauging • Mechanical
- Prints & Drawings • Process Control • Quality
- Safety • Structural Engineering • Surveying
- Thermal • Workplace Effectiveness



## FANUC

## FANUC's CERT

### Certified Education Robot Training



FANUC LR Mate 200iD/4S  
Fenceless CERT Cart

As more companies incorporate robotics into their operations, the demand for high-paying careers related to designing, implementing and using industrial robots is increasing. 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!

### 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 is available).

#### Education Tooling Package

- 120VAC transformer
- Compressor
- Vacuum or clamping gripper
- Tooling

#### Optional:

iRVision CERT Instructor Program

- 2D integrated iRVision software, camera & cable
- Web and live training course on vision setup and operation

#### CERT Training Program

- HandlingTool software
- ROBOGUIDE simulation software
- Web courses on robot operations
- HandlingTool and HandlingPRO

#### Additional Options:

- Project Based Learning
- Force Sensor
- Conveyor (in bound/out bound)
- Vision lighting kit
- Custom solutions incorporating any FANUC robot
- Dual robot material handling system



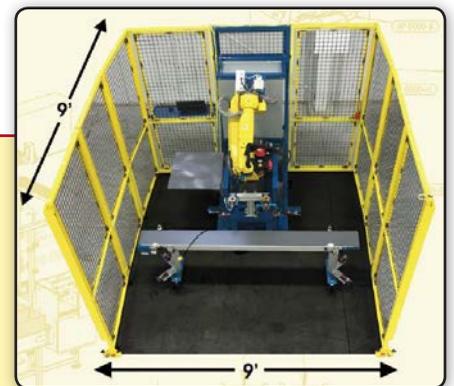
The **CR-35iA**, the first-ever force limited Collaborative Robot from FANUC, combines unrivaled strength with outstanding safety to make interactive robot/human collaboration possible for a much wider range of applications. This is the only Collaborative Robot in the world that can lift heavy objects,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

#### Advanced Manufacturing CERT Cell

Introducing, the **AM-CERT**, a FANUC CERT Cell specifically built for Advanced Manufacturing!

FANUC America partnered with one of their industrial integrators 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!

**Material Handling • Machine Tender • Fenceless Machine Tender**





## 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

### 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.

powered by:



### 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.

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 AICCI mode. In this way the part can be machine extremely fast and precise.



#### The main benefits of the ROBODRILL are:

- 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





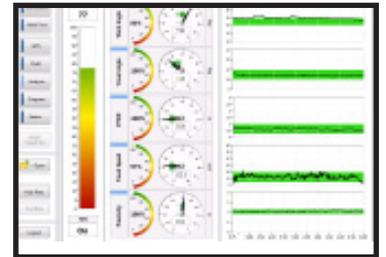
REALWELD Trainer™ offers a unique approach to welding training. It's the first virtual welding trainer intended for use in a welding booth - real welding training under real conditions using any brand of welding equipment.

REALWELD Trainer™ technology far exceeds virtual reality welding training technologies in terms of its range of applications and impact. The patented motion capture system teaches muscle memory by measuring manual welder motions (torch angles, travel speed, contact tip to work distance (CTWD) and proximity) and welding parameters (current, voltage, wire feed speed) in real-time to identify deviations from a given welding procedure specification (WPS).

REALWELD Trainer teaches multiple welding processes in a number of welding positions (1F, 2F, 3F, 4F, 1G, 2G, 3G, lap joint, tee joint, groove joint, and flat plate joints) and prompts the user with audio coaching in both Arc On and Arc Off modes to help develop proper technique and position. Welding procedure specifications can be created and modified by the instructors as needed.

## APPLICATIONS

**RealWeld Trainer's™** unique approach to welder training meets the needs of both instructors and trainees for schools, career centers, and manufacturers. RealWeld Trainer™ allows a **reduction in training costs and an increase in training effectiveness** with accurate real-time feedback and immediate post-weld analysis.



*Vivid Display Indicates Weld Analysis, % of Parameter, Welder's Action and Tolerance*



- **Empowered Training:** Instructors can use existing curriculum or create their own. Trainees assess their own or each other's performance with immediate visual, auditory, and quantitative feedback allowing them to understand and reinforce proper technique.
- **Screening:** Instructors can reliably and objectively screen the skill level of in-bound trainees.
- **Recruiting:** A floor dolly provides easy transport to job sites or recruiting events that incorporate either live welding or just practice arc-off weld trials.
- **Conserving Material:** Initial torch positioning and practice runs can be performed without welding to conserve materials.
- **Workforce Development:** Data recorded on each trial allows the instructor to assess the trainee's progress and reliably recommend trainees based on their proficiency welding to the employer's WPS.
- **WPS Documentation Quality:** Create or enhance a WPS by capturing the technique of a master welder: A great benefit to manufacturers and a revenue opportunity for colleges and career centers.



## TRAINING EQUIPMENT

Lincoln Electric offers the welding instructor and educator the right tools to bridge the manufacturing skills gap.



### VRTEX® Engage™

This standalone system, designed to introduce basic skill trades to students in non-traditional academic settings, gives users a taste of the more advanced VRTEX system designed specifically for welding training.

VRTEX Engage includes a touch screen, monitor, welding gun, tracking device and a placemat to simulate the work surface. It's all contained in a lightweight and highly portable carrying case that can be deployed in any setting – industrial, educational or elsewhere.

### VRTEX® 360

#### Virtual Reality Arc Welding Trainer

The VRTEX 360 is a best-in-class, advanced level welding training system. It is designed to provide a full featured, expandable platform in an easy to use and engaging welding training tool. The VRTEX system is ideal for basic to advanced welding training, as a testing, recruitment and engagement tool for educational and industry and for preparation for advanced level evaluation for instructors. The VRTEX 360 is constantly on the move incorporating additions for your training purposes each year!

#### Features:

- Supports All Out of Position Welds
- User Machine Interaction
- Dedicated Welding Gun and Stinger
- Tabletop Coupon Stand



## TEACH YOUR TRADE. WE'LL DO THE REST.

Sign-up for a FREE 30 Day Trial today!

[tech-labs.com/ulinc](http://tech-labs.com/ulinc)





## VRTEX® Mobile Virtual Welding Trainer

The VRTEX® Mobile is a basic, entry level welding training system. It is designed to provide mobility in an easy to use and engaging welding training tool. The VRTEX® Mobile is ideal for initial, basic welding training, as a recruitment and engagement tool for educational and industry and for employment and screening for human resources or as an evaluation tool for instructors and educators to get a baseline on student knowledge.

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## ClassMate™ Robotic Trainer

*Advancing the Manufacturing Skills of the Next Generation*

The Robotic ClassMate Cell is a complete robotic training solution designed to meet the need for advanced manufacturing training. Instructors can teach robotic concepts in the classroom and quickly move to the lab for welding practice. Students can perform offline programming and then test their skills at a manufacturing-ready robotic cell.

### Ideal For:

- Training and demonstration in a lab, classroom, or recruitment event
- Technical training at universities
- Trade schools
- Workforce development programs



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## Lessons in Arc Welding Curriculum for the VRTEX®

Lincoln Electric is pleased to introduce the New Lessons in Arc Welding Curriculum for the VRTEX®. Based on AWS EG 2.0 (Guide for the Training of Welding Personnel: Level – Entry Welder), the Lessons in Arc Welding Curriculum for the VRTEX® is designed to offer an enhanced method of learning using traditional welding training projects and virtual reality welding projects. Instructors have the flexibility to implement the curriculum in their lesson and training programs.



## Oil & Gas Training

Process Units, Acrylic Working Demonstrators, Cut-Away Valves & more!



### DTU-2 Portable Glass Distillation Training Unit

The Process Operator Training Unit (DTU-2) developed to give the operator of fractionation and distillation equipment a visual concept of what goes on inside those metal towers or columns that dominate the landscape in a petroleum refinery or petrochemical plant.

There are no automatic controls so that whatever happens on this unit is dependent on what the operator does, or does not do. The glass fractionating column allows the operator to see the results of actions very quickly. Consists of the following equipment; Main Column, Pumps (4), Overhead Condensers, Heat Exchangers, Cooling System, Reboiler, Temperature Gauges and piping to actually perform distillation on a small scale model.



### PDTM-2 Pump Demonstration Working Model

This “see through” training model has many features that can be used to train operators on the mechanical workings of a centrifugal pump. By manipulating the flow with suction and discharge valves and adjusting RPM's this model can demonstrate cavitation and other pump and flow phenomena. Our Pump Demonstration Model is a very popular tool for a site and sound concept of these workings, which cannot be experienced in the field or with drawings or computer simulations.



### 3PS Three Phase Separator

The 3PS Three Phase Separator was designed to simulate process specific phenomena associated with the separation of gasses and fluids typically found in a crude oil production stream. This process trainer is a self contained unit which continuously mixes air, water, and a hydrocarbon based fluid which then flows into a series of ‘see through’ vessels where gravity separation takes place. The liquid components are returned to individual storage tanks prior to reblending, and the air is discharged to atmosphere. The trainer is equipped with process measurement devices and is operated from an integral control panel.

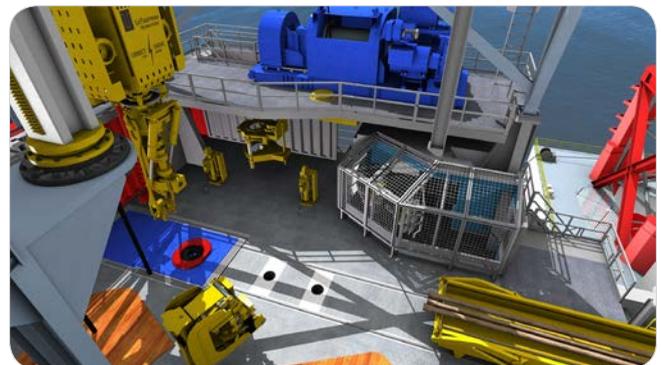
### Cut-Away Valves

We offer an variety of the more common valves found in oil refineries and chemical plants which are cut-a-way so you can see and identify the internal components. The Cut-Away Valves may be taken apart and reassembled for training purposes.



## hiDRILL Simulator

Our full sized hiDRILL simulator delivers unique functionality for drilling training. Offering fully equipped cyber chairs, emulated control systems and a full topside and downhole solution, hiDRILL can be delivered with different high-quality visual systems, based upon your requirements. It is an innovative and realistic dynamic drilling simulator. With full visualization in real time, it reacts to the crews input as it is offshore. Thanks to its flexible and modular structure, you can use the generic topside model alone, add a generic downhole model, or make a specific downhole and topside models.





## Desktop Metal™

### Studio System

Affordable desktop metal 3D printing designed for engineers.

#### Cost-Effective

The Studio System is up to ten times cheaper than comparable laser-based systems. With purchase and subscription pricing options, it's the only metal 3D printing system that is cost-effective for engineering teams.

#### Safe

We eliminated lasers and powders to make the Studio system safe for any facility. Unlike other systems, there are no special facilities or 3rd party equipment required—just power and an Internet connection.

#### The Printer Shapes the Parts



Unlike laser-based systems that selectively melt metal powder, the Studio printer extrudes bound metal rods—similar to how a plastic **Fused Deposition Modeling (FDM)** printer works. This eliminates the safety requirements associated with metal 3D printing while opening up new alloys and enabling new features like the use of closed-cell infill for lightweight strength.

#### How it Works

The furnace combines SiC heating elements with high-powered microwaves to sinter printed parts after primary binder is removed.

Cloud-connected, the furnace has temperature profiles that are tuned to every build and material. It uniformly heats parts to just below their melting point, removing binder and fusing metal particles to form fully dense parts without the residual stresses introduced in laser-based systems.

#### Specifications

**Speed:** 16 cm<sup>3</sup>/hr

**Layer height:** 50 μm

**Build Area:** W 300 x D 200 x H 200 mm

**Tight Tolerances:** ± .002 in/in (geometry dependent)

#### The Furnace

**Heating:** Hybrid; Microwave-enhanced

**Peak Temp:** 1400°C

**Footprint:** H 150 x W 125 x D 75 cm

No more waiting for machined or cast parts. Iterate faster by printing highly complex metal parts—without leaving the office.



## Laser Cutting, Engraving, and Marking Machines and Equipment

Universal's patented technology improves the user's experience and makes material processing more effective and productive. The following features are a few of the unique innovations offered only by Universal Laser Systems.

For more information, go to page 37.

**UNIVERSAL**<sup>®</sup>  
LASER SYSTEMS





## Additive Manufacturing



### Benefits

- Component weight reduction - only build material where required for optimized part functionality
- Rapid design iterations
- Bespoke or customized items
- Multiple parts consolidation
- Reduce tooling costs
- Build complex geometries such as thin walls, lattices and internal features
- Increased design freedom - AM is not constrained by traditional design rules

### AM 400

The advantage offered by the AM 400 is the possibility to develop parameters that deliver higher productivity through faster scan speeds, whilst still maintaining feature definition and precision. An additional benefit is the direct transferability of existing 200 W material file parameters from the AM 250 200 W system. The increased laser power of 400 W focused at 70 µm also provides the potential to process materials with elevated melting temperatures, with a significant increase in energy density compared to the current AM 250 400 W system.



### RenAM 500M

RenAM 500M has a higher level of automation compared to the more flexible AM250 and AM 400 platforms. Powder sieving and recirculation are all carried out within the compact system automatically, reducing the need for manual handling and exposure to materials. This provides increased safety and sustained quality of the metal powders.

### Reduced Build Volume (RBV)

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



### QuantAM File Preparation Software

Renishaw QuantAM is a dedicated file preparation software tool for Renishaw additive manufacturing (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.

Visit [tech-labs.com/renishaw](http://tech-labs.com/renishaw) for more information.



## STEM Design

Our complete STEM curriculum works straight out of the box



**LJ CREATE™**  
Learning for life

### Aims of the *Exploring STEM* program

- Increase students' enthusiasm for STEM through active, project-based learning
- Improve students' understanding of basic concepts of engineering and technology
- Help students see the connections between the STEM subjects
- Expose students to a wide range of STEM career pathways
- Help students understand the diversity of applications of STEM in a wide range of different areas of industry and everyday life.
- Develop 21st Century Skills such as critical thinking, problem solving, creativity, team working, and the ability to process, question, and analyze information.

"One of the benefits of the program for the students is that it encourages them to do more critical thinking and problem solving; they really have to think about their answers."

Mr. Leavernard Jones  
Technology Teacher

## Engineering

Ensure your students have the right skills for the job – our engineering program is designed to bridge the skills gap

Our engineering program comprises three main strands of Control and Instrumentation, Mechanical Engineering and Electronic Engineering. Our comprehensive program addresses a broad range of related engineering areas, including:

- Industrial Control Trainer
- Electrical Engineering
- Electronics
- Mechatronics
- Mechanical Engineering
- Engineering Science
- Engineering Materials Technology
- Manufacturing Techniques

Contact us for a **FREE demo** of our online library!

"One of the reasons we really liked working with LJ Create was that they had so much to offer us in the way of engineering teaching resources."

Lynne Spinarto  
Technology Chair Person at MacArthur High School





# Science, Technology, Engineering & Math

*MINDS-i is rocking the robotics world through a high-technology platform that is simple to use, extraordinarily durable, infinitely modifiable and relevant for the 21st century.*



The MINDS-i Vision MINDS-i Robotics has a revolutionary vision of what robotics should be. This vision fuels the MINDS-i line of products - build a robot using our patented quick lock construction elements designed to be extraordinarily durable, infinitely modifiable and undeniably equipped to achieve the best performance, no matter where the path leads.

## **Minds-i STEM Robotics Foundations Lab - 6X6**

*High School and Post Secondary STEM & Robotics Curriculum*

This student LAB is designed to accompany the MINDS-i Foundations Curriculum as an introduction into the world of STEM and Robotics. It is designed as an interactive approach to applied science, technology, engineering and math. In this course students will become familiar with the basics of robotics and programming through teamwork.



## **Minds-i Drones Lab**

*MINDS-i's Curriculum combines STEM with essential life skills relevant to today's needs*

This student LAB is designed to accompany the MINDS-i Drones Curriculum as an introduction into the world of Drones and Robotics. It is designed as an interactive approach to applied science, technology, engineering and math. In this course students will become familiar with the basics of Drone robotics and programming through teamwork.

## **Minds-i STEM Robotics Foundations Lab - 4X4**

*High School and Middle School STEM & Robotics Curriculum*

This student LAB is designed to accompany the MINDS-i Foundations Curriculum as an introduction into the world of STEM and Robotics. It is designed as an interactive approach to applied science, technology, engineering and math. In this course students will become familiar with the basics of robotics and programming through teamwork.



## An interactive approach to STEM Education



## 3D Scanners

*3D Digital Corporation is the innovative leader in the manufacture of lightweight, USB 3D laser scanners that provide extremely high accuracy, yet are affordable and the most easy-to-use product on the market.*



3D Digital Corp's Optix and economically viable Escan scanners are the perfect solution to provide students and universities with another avenue to explore the world. 3D optix scanners have been used in numerous universities all across the world and help students succeed in their academic goals to create a bright future for them personally and the world as a whole.

### Benefits:

- Reverse engineering at an affordable price
- Imports directly into popular CAD and CAM programs
- Exports .stl, .obj, .ascii and other file formats
- Produces 3D scanner images quickly and effectively
- Complete 3D scanner software solution
- USB Plug & Play



## Escan

The Escan Standard Base and Escan Extended Base models can be upgraded to Enhanced Escan. Enhanced Escan provides the high resolution option, which allows you to increase the maximum points per line from 980 to 1920. This reduces the amount of approximation in the scanned data, allowing for more detail to be captured. This upgrade to an Enhanced Escan model includes an advanced lens and higher density CCD array. The advanced lens option will minimize the amount of "noise" in the data, greatly reducing deviation and allowing for cleaner scans.

## Optix 500 Series

*Cutting edge laser technology that makes precision 3D object scanning - quick and simple.*



The Optix 500 Series sets new standards for accuracy and resolution, and is the premium choice for 3D object scanning. Three configurations produce optimal precision across a spectrum of scan-range sizes and each model is modular, lightweight and portable.

With a reputation for industry-leading flexibility and performance, the Optix 500 Series is widely used in the aerospace, automotive and tool-and-die markets for inspection and quality control.

Visit [tech-labs.com/3d-scanners](http://tech-labs.com/3d-scanners) for more information.



## AuSIS™ Scanners

*Our state of the art AuSIS line of 3D scanners and inspectors are unlike anything else on the market! We have a solution for every level or education. We'll work with you to make sure you have exactly what you need.*



### Shop Inspector™

The newest member of the 3D Digital family is the AuSIS™ Shop – Inspector™, which stands for Automated Scanning Inspection Systems. The first scanner in this line of three models, this scanner will allow you to simultaneously scan, compare and report at virtually the touch of a button. With these abilities, this 3D digital scanner will help you reduce time and save money.

### Robot Inspector™

The AuSIS™ Robot – Inspector™ gives you the flexibility of scanning medium sized objects. AuSIS™ stands for Automated Scanning Inspection Systems. This inspector will scan, stitch together and show the results of your scan in near-real time. The versatility of this system will allow you to process your scan faster and more accurate than ever before.

### Multiple Scanner

The largest and most versatile member of the AuSIS™ family of 3D Digital scanners. The Multiple Scanner gets its name from the fact that it uses multiple scanners together to simultaneously scan larger objects faster and more accurate. This system is a unique tool that will give you the versatility you need. We will work with you to ensure you have the ideal scanning solution to fit your needs.

Whether you choose the Shop Inspector, Robot Inspector, Multiple Scanner or a hybrid setup, your AuSIS scanning system delivers a fully automated inspection solution.

You will start by setting up the system, programing it once and begin scanning. The fully automated system will start with and individual scan followed by additional scans which will align automatically. Finally, all of the auto aligned scans are compared to the CAD model for a go/no go accuracy gauge. A single click allows you to inspect the variation between the scan results and the CAD model. Additionally, the system allows you to evaluate measurements of the scanned object.

Combining ease of use with the highest level of accuracy in the industry, the fully automated AuSIS system is a powerful solution for your inspection needs.



## Professional 3D Printing Systems in all shapes and sizes

### Idea Series



The **Stratasys Idea Series** levels the playing field by bringing professional 3D printers to individuals and small teams, accelerating creativity.

Size up each system to find the affordability and speed right for you:

- **Mojo** - Affordable, fast color printing
- **uPrint SE** - Larger models
- **uPrint SE Plus** - Larger models in nine colors

### Design Series



Stratasys Design Series 3D Printers dramatically tighten design and development cycles, improve communication and collaboration, and resolve issues between design and engineering. They speed products to market and reduce costly mistakes — all while keeping your intellectual property onsite.

**Precision 3D Printers** - Based on PolyJet 3D Printing technology to give you the best surface quality, finest details and widest range of material properties available. Produce color and multi-material models that look and feel just like your future products.

**Performance 3D Printers** - Powered by FDM Technology, these printers deliver models in real ABSplus thermoplastic. Parts are durable and dimensionally stable — perfect for tough testing. And materials are affordable, so you can work creatively and test frequently.

### Production Series



The Stratasys Production Series is built to streamline manufacturing while maximizing your possibilities — handling the largest prototypes and accurate low-volume parts with agility.

**Performance 3D Production Systems** - give you durable, accurate parts with predictable mechanical, chemical and thermal properties. Based on FDM Technology, these systems use the same production-grade thermoplastics used in injection molding, CNC machining and other traditional manufacturing processes.

**Precision 3D Production Systems** - Bring agility and aesthetics to every stage of product development and production. Based on PolyJet 3D Printing technology, these systems offer amazing surface smoothness, ultra-fine details and the widest range of material properties available.



# UNIVERSAL LASER SYSTEMS

## Laser Cutting, Engraving, and Marking Machines and Equipment Uniquely Universal Features

Dedicated to the advancement of laser systems, Universal's patented technology improves the user's experience and makes material processing more effective and productive. The following features are a few of the unique innovations offered only by Universal Laser Systems.



### CONTROL, MANAGEMENT AND USABILITY SOFTWARE

The world's most advanced, powerful and flexible software for laser material processing systems. The laser systems include a materials-based print driver that gives you the choice of automatic or manual control over power, speed, pulses per inch and other settings. Universal provides a comprehensive materials' database giving the user complete control over the laser processing system.

### INTERCHANGEABLE LASERS

10.6μ CO<sub>2</sub> lasers are available for laser systems, in either single or multiple laser configuration. The lasers in the system can be individually or simultaneously controlled, quickly delivering a wide power range from 10 to 150 watts. Also available are 9.3μ CO<sub>2</sub> and 1.06μ fiber lasers. Every laser source is factory pre-aligned for easy integration into Universal's laser platform depending on wavelength and power.

### DUAL LASER CONFIGURATION\*

A Dual Laser system combines the beams from two lasers into a single beam. This maximizes cutting, engraving and marking power. Using a patented technology, the system configuration eliminates polarization effects and delivers beam quality superior to that of a single laser.

### MULTI-WAVELENGTH TECHNOLOGY\*

Universal's Multi-wavelength technology is designed to support three different types of wavelengths to process the broadest possible spectrum of materials: 10.6μ, 9.3μ and 1.06μ.

### SUPERSPEED™\*

This option requires Dual Lasers. Beam combiner optics create two, parallel laser beams that are slightly offset from one another. Each beam is controlled independently in order to produce two raster scan lines simultaneously.

### HPDFO™

*(High Power Density Focusing Optics)*  
Delivers the smallest laser spot size available for CO<sub>2</sub> and fiber lasers enabling very finely detailed marking and engraving and is viable for cutting on CO<sub>2</sub> systems.

### PASS THROUGH\*

When used in conjunction with an approved work environment, Universal's large-format ILS and XLS laser system platforms can be configured to process materials of unlimited length in full compliance with Class IV laser safety regulations.

### 1-TOUCH LASER PHOTO™

An exclusive software application optimizing any photograph for laser engraving. The software applies special filters to the image and adjusts the contrast and definition appropriately for the material being processed.





## Level 1



## Fab Labs

- ❑ **Stratasys Mojo or uPrint 3D Printer**  
Bring professional 3D printing to your workspace. Soon, you'll be asking yourself how you ever got through the design process without one.
- ❑ **3D Digital 1MP Scanner**  
3D Digital Corp. has pioneered a reverse-engineering solution that's affordable and complete.
- ❑ **Denford CNC**  
A compact CNC system with totally enclosed interlocking guard, suitable for all levels of education and training.
- ❑ **VLS Universal Laser Systems**  
Desktop and free-standing systems with a material processing envelope up to 32" x 18" x 9" ranging in power from 10 to 60 watts.

## Level 2



- ❑ **Design Series 3D Printers: F123 Series / Dimension 1200 / Fortus 250 / Objet / Eden**  
These 3D Printers deliver durable and dimensionally stable parts — perfect for tough testing and prototyping.
- ❑ **2 MP Scanner / Optix / SAS 3D Scanners**  
Reverse engineering at an affordable price
- ❑ **FANUC Levl Cart**  
Affordable and portable training solution on real FANUC hardware.
- ❑ **Universal Laser System PLS6.150D**  
As a dual laser platform, the PLS6.150D can support up to two 10.6μ CO2 lasers with a power range of 20 watts to 150 watts.

## Level 3



- ❑ **Stratasys Fortus or Connex 3D Printer**  
Additive manufacturing is where the world is going, and nothing will get you there faster than the truly transformative 3D production systems.
- ❑ **Optix / AuSIS**  
We offer a variety of 3D Scanners depending on your requirements.
- ❑ **FANUC Robodrill**  
A fully-fledged compact CNC milling, tapping and drilling center that delivers unrivalled quality and precision.
- ❑ **Universal Laser System XLS10.150D**  
The newest and highest performance laser material processing solution designed for highest acceleration and speed plus highest precision and accuracy.





## LJ Create Automotive

**Our practical NATEF-aligned programs take your students from beginner to shop-ready**

This program has been designed to allow you to build a NATEF certified automotive program that will enable your students to become new hi-tech auto technicians.

A unique blend of online digital learning resources and practical equipment combines to create an automotive teaching program that will deliver the knowledge and practical skills students need to achieve success.



### Automotive theory taught in a practical way

- Sectioned Components
- Autotronics Panel Trainers
- Autotronics Boards
- System and Component Rigs
- Medium/Heavy Truck Rigs

**Our learning content is aligned to NATEF standards - at MLR, AST, and MAST levels!**

**We continually update our content to meet these standards.**

### Beautiful, Immersive Content:

- Easy access via cloud-based portal
- Continuously updated content
- Access for all enrolled students and staff
- Student and school performance reporting facilities

"It's totally different here, we've got computers and all these trainers. It's an excellent way to learn and is much better than just reading books. We have our own laptops so I can go home and study, so when I come in here I can get 100%!"

- Alex Diaz, Automotive Student



## SIMLOG

### Heavy Equipment Simulation Training

Teach Heavy Equipment operations safely and affordably with Simlog's 10 PC-based Personal Simulators for Construction, Mining and Forestry. Each simulator leverages the power of today's off-the-shelf (Windows) PCs to finally provide truly cost-effective help for training heavy equipment operators. Chose the USB-ready replica controls or the OEM Industrial Chair option and you can begin training in minutes!

Add Simulation Manager software to track each students results and competencies as they progress through the training.

With Simlog, your students will be learning the right way to do things, thanks to "best practices" input from our OEM partners and training professionals just like you. So you'll find the right kind of simulated tasks, the right kind of task progression, and the right way of evaluating the simulated work.

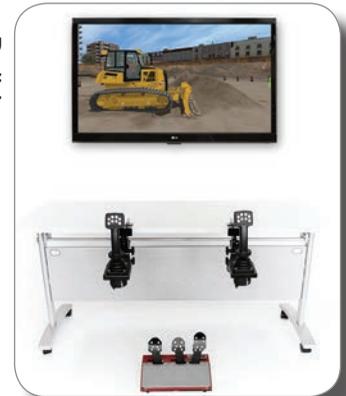
#### Getting Started is Easy!

- Select the Personal Simulators that fit your program
- Choose the right USB Replica Controls for your setup
- Identify a suitable desktop or laptop PC and video display

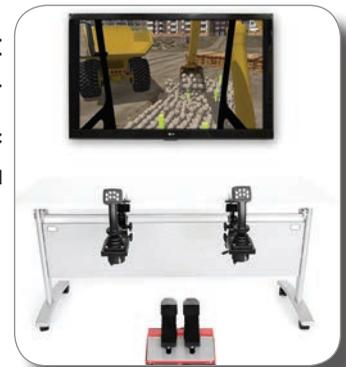


**Also Available:** Mobile Crane, Tower Crane, Off-Highway Truck, Mining Truck, Electric Rope Shovel, Drill Jumbo, Forwarder, Harvester, Material Handler

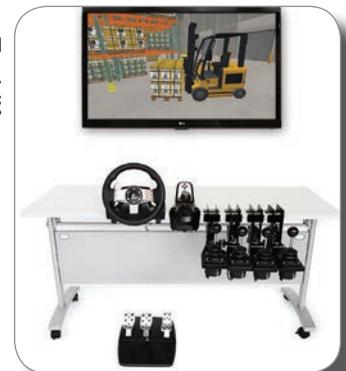
Bulldozer



Hydraulic Excavator



Forklift



Wheel Loader





## MOBILE ELECTRONICS Certification Programs



### *The Mobile Electronics Installer Course introduces students to the exciting field of mobile electronics!*

The **Marcraft Mobile Electronics Installer Course** provides the foundation knowledge to obtain the industry recognized Mobile Electronics Certification Professional (MECP).

The **Marcraft Mobile Electronics Text/Lab Guide** is designed in conjunction with the revolutionary dashboard trainer offered exclusively by Marcraft. The full-size tabletop trainer provides a visual and hands on learning experience unlike any other.



### The Mobile Electronics Trainer



The Mobile Electronics Installers Theory Text and Lab Guide explores the following critical learning components:

- Late Model Vehicle Construction Philosophy
- Fundamentals of Multimeter Use
- Tools and Shop Safety
- Introduction to Mobile Electronic Equipment
- Audio Component Interconnection
- Component Installation Techniques
- An Introduction to the Sound Wave; Acoustic Principles
- Introduction to Acoustical Principles
- Introduction to Automotive Charging and Electrical Systems
- Audio system noise principles
- Introduction to relay theory
- Security System Architecture
- Vehicle Systems Interconnection
- Aftermarket Security System Interconnection
- Mobile Electronic Systems Design Philosophies
- Charging and Electrical System Upgrades
- Introduction to Crossover Fundamentals
- Introduction to Low Frequency Systems
- Introduction to Navigation Systems
- Introduction to Mobile Video Systems
- Introduction to Remote Control Starters



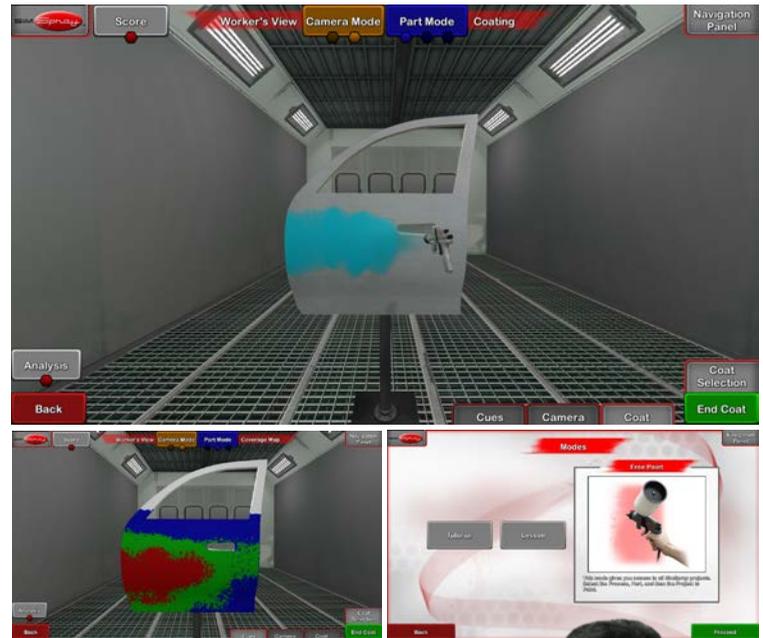
# ransportation, Distribution, & Logistics

## Automotive Painting and HVLP Coating

SimSpray is the immersive virtual reality spray painting simulation, teaching fundamental spray painting skills for HVLP processes.

Visual cues, detailed scoring, pass, and performance tracking provide a continuous source of feedback. Realistic paint effects show the coat quality, thickness, and defects produced by the student's technique.

*Training with SimSpray is quicker, safer and cost-efficient.*



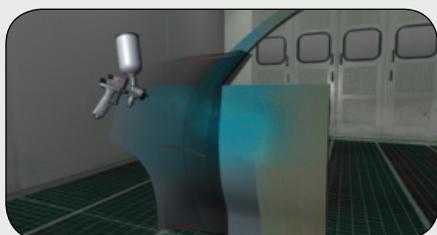
The head mounted display (HMD) shows the virtual environment and chosen part. In the environment, students use the SimSpray paint gun to paint the project.

Through the monitor, instructors and students can see the project from the painter's point of view, a detailed review mode, or a paint coverage mode. Each view provides valuable insight for improving paint technique. SimSpray can be connected to external for classroom training experiences.

Increase hands-on practice by eliminating time spent on part cleaning and drying processes.

Objective scoring, live feedback, and detailed performance metrics guide students to skill mastery.

SimSpray is designed for classroom, shop, and off-site locations with its easily stored, mobile, turn-key features.



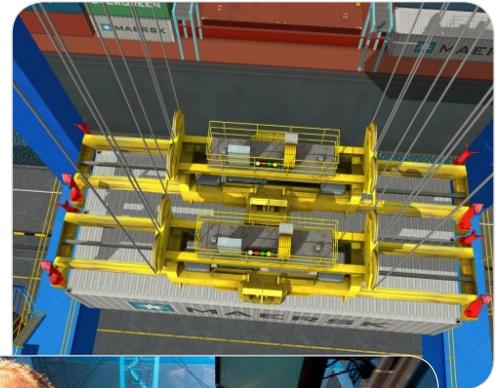
### Add-On: Edge Blending

The Edge Blending module teaches the proper technique for spot and panel painting. Students learn to blend new and existing paint through increased access to practice projects.



## hiCRANE Port Simulators

hiCRANE Port simulators provide high quality 3D visualization of a synthesized virtual container or bulk terminal. In the full-scale simulators, the crane operator is seated in a cabin fully surrounded by an interactive world, which can be easily populated and configured by the instructor. He has full flexibility to generate exercises resembling real conditions. The combination of visual information, physical movements and audio, results in a very realistic simulation of the actual working environment. Moreover, the ability to log, replay, report and analyse simulation runs, helps the instructor to execute the training in the most efficient manner.



- Real-time - hands on training
- Realistic sights, sounds and motion
- User-Friendly Instructor stations
- Cost-effective solutions
- Absolute confidence



## Maritime Simulation & Training

Thanks to close cooperation with marine schools worldwide, Transas specialists have ensured that the functionality of Transas simulators provides effective training and competence assessment for seafarers. The simulators enable various levels of training, from familiarization, standard operation and watch-keeping, to advanced operation, troubleshooting and vessel resource management.



- Transas marine simulation systems have been used extensively by specialists in commercial fleets, navies and coast guards;
- More than 5,500 Transas simulation systems are installed in over 1500 training and simulation centers in 106 countries;
- Transas securely holds 45% of the international commercial maritime simulation market;
- Transas simulators are developed in line with key international maritime requirements (STCW, IMO model courses and specialized standards), and hold certificates from leading classification societies.

### Products Available

- Navigational simulators
- GMDSS simulator
- Engine room and cargo handling simulators
- Crane Simulator

# The Tech-Labs Difference

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

## Consulting

Before the space planning begins, our staff will meet with you to understand your educational 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 administrators, faculty, 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. And 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.

 <b>TECH-LABS</b> Creators of Learning Environments	<b>Contact Service Department:</b> support@tech-labs.com tech-labs.com/support 1-800-445-1088
Date: <input type="text"/>	Model Number: <input type="text"/>
Serial Number: <input type="text"/>	Order Number: <input type="text"/>

Our mission is to provide cutting edge technology, equipment and curriculum to educators that will help every student achieve success in the world of tomorrow.



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