

2020-2021

# CAREER & TECHNICAL EDUCATION PRODUCT & CERTIFICATIONS GUIDE



**Allegheny**  
Educational Systems, Inc.



**800-232-7600**

Celebrating 40 years as your trusted partner in education

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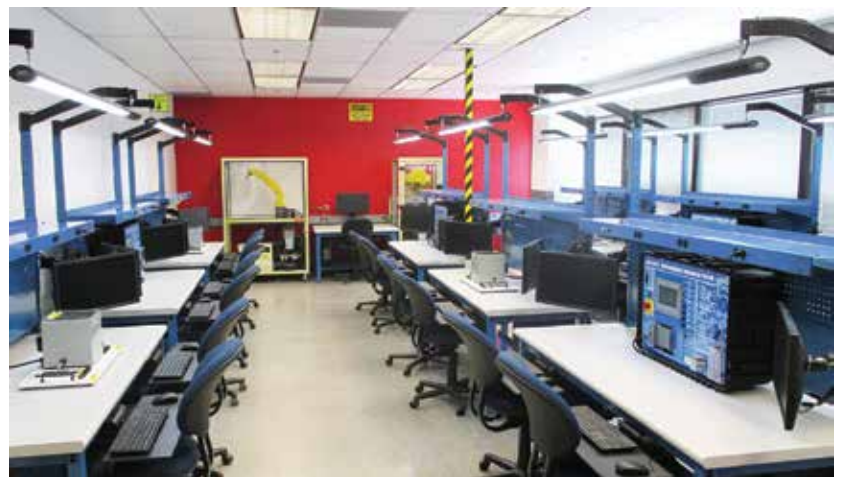
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## **ABOUT US**

Founded in 1979, Allegheny Educational Systems provides innovative, technology-based educational systems and professional services to over 2,000 schools, colleges and universities throughout Pennsylvania, New York and New Jersey.

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.



*FANUC and Amatrol  
training lab at New  
Jersey Institute of  
Technology*



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# ARCHITECTURE & CONSTRUCTION CLUSTER: C.I.P. 47.0201 HVAC MAINTENANCE TECHNOLOGY/TECHNICIAN



## Amatrol's 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.

# ARCHITECTURE & CONSTRUCTION CLUSTER: C.I.P. 47.0201 HVAC MAINTENANCE TECHNOLOGY/TECHNICIAN

# iConnect<sup>®</sup>

TRAINING



**iConnect Training Systems** produces the finest HVAC/R training units for the educational market. They can be found in high schools, Career Centers, Community Colleges and Industry Training Centers the world over. The series of HVAC training units includes everything from basic heating and cooling training systems to “Build Up” trainers and Technician Equipment packages.



## MODEL TU-805 - Mobile Table-Top Air Conditioning and Refrigeration Trainer

This training unit demonstrates basic refrigeration and air conditioning principles in a compact size perfect for in the classroom or mobile training.

*Training Curriculum, Workbooks, & Certification available soon!*



*This trainer enables students to learn principles of commercial and industrial refrigeration systems.*

## MODEL TU-155 - Industrial Refrigeration

### Features:

- Trainer: Self-contained and freestanding with storage space underneath
- Compressor: Semi-hermetic type with 2 HP capacity
- Crankcase heater with automatic control system
- 2 forced air type evaporators have 2 common types of defrost mechanisms complete with solenoids, timers, and associated equipment
- 2 standard types of water cooled condensers (tube-in-tube and shell-in-tube) supplied and piped to be used with city water and included water tower
- Hot gas by-pass system keeps operating pressures of the compressor constant regardless of the evaporator level
- Crankcase pressure regulator allows the compressor to start easily under high evaporator pressures



## iManifold

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

- **Over 40 Refrigerants** –Accommodates the whole spectrum of most common refrigerants.
- **Troubleshooting** – Logarithmic technology that identifies common system problems and recommended fixes.
- **VeriFi™ by Imperial Reporting** – Provides students a snap shot of system performance at conclusion of project.
- **Deep Draw Manifold** – To educate on evacuate process.
- **Wireless Updatable Firmware** – Eliminates need to send unit back when new upgrades become available.



# ARTS & COMMUNICATIONS CLUSTER: C.I.P. 50.0402 COMMERCIAL & ADVERTISING ART C.I.P. 10.0399 GRAPHIC COMMUNICATIONS, OTHER

## stratasys

GOLD PARTNER

2020

### The F123 Series

**Precision printing.  
As easy as F123.**

The award winning Stratasys F123 Series is easy to operate and maintain, whatever your level of experience. The F123 series combines powerful FDM technology with design-to-print GrabCAD software for the most versatile and intelligent solution available. Produce highly accurate, reliable prototypes, student projects, production parts and more. Do it all without the need for dedicated expert staffing. And share it across classrooms, campuses and a variety of your academic programs.



**TPU 92A elastomeric material  
available for F123 Series!**

*\*TPU 92A is standard on F370, and as an optional upgrade on F170 and F270.*

#### F123 Series features:

- **Minimal Setup** - simply plug and print. Give your entire workgroup access to professional industrial grade 3D printing.
- **Non-stop printing** - spend less time troubleshooting and more time getting results.
- **Fast and easy material swaps** - maximize your team's productivity.
- **Smart software** - GrabCAD Print™ software simplifies the entire 3D printing process with an intuitive CAD-like application anyone can use.
- **Print up to five different materials** - The F120 supports ABS and ASA; the F170 and F270 models support PLA, ABS-M30, ASA and TPU 92A\* materials; the F370 supports PLA, ABS-M30, ASA, PC-ABS and TPU 92A\* materials. (PLA uses breakaway support only.)
- **All-new fast-draft mode** - prints twice as fast as standard build mode while consuming just a third of the material on average.

# Ultimaker

## Ultimaker 3D Printers Fueling innovation-driven education

Ultimaker's products and solutions encourage students to address real-world problems, regardless of the grade level. It's Ultimaker's goal to set the engineers, artists and designers of the future on the right path, and to support their learning along the way. Ultimaker 3D printing solutions are the perfect accompaniment to developing key skills in science, technology, engineering, art and math (STEAM).



### Ultimaker S5

The Ultimaker S5 combines dual extrusion, advanced connectivity, and an open filament system with a large build volume for a classroom-friendly 3D printer, offering unrivaled quality and reliability at scale.



### Ultimaker 3

Engineered for efficiency, reliability and precision, the Ultimaker 3 features dual extrusion with water-soluble support, advanced connectivity, and an open filament system.

# CREAFORM



## Creaform 3D Scanners

Discover Creaform ACADEMIA, a brand-new solution suite for teachers looking to educate and inspire using metrology. Addressing the inherent realities of the academic world, it fosters experienced-based learning and development using tools widely used in Industry 4.0, allowing you to enhance your curricula and better prepare students for their careers ahead.

The solution suite includes the Creaform professional-grade ACADEMIA 3D scanner, free application software, and complimentary add-ons tailored to get you started with industrial 3D measurement technologies. Achieve the highest level of quality teaching possible—all while taking advantage of the latest innovations on the market and not breaking the bank with Creaform ACADEMIA.



# ARTS & COMMUNICATIONS CLUSTER: C.I.P. 50.0402 COMMERCIAL & ADVERTISING ART C.I.P. 10.0399 GRAPHIC COMMUNICATIONS, OTHER

## Epilog Laser Engravers/Cutters

From industrial shop classes to art programs, schools around the world are discovering what a powerful tool a laser can be in the education of students. The laser process can incorporate industrial design, artistry and woodworking skills. It can increase a student's ability to think critically while developing creativity.



EpilogLaser



### A Full Product Line to Meet Your Needs:

- Epilog Zing Product Line
- Epilog Legend Product Line
- Epilog Fusion Product Line
- Epilog Fiber Laser Product Line

*Use in a Variety of Classes:* A CO2 laser can be used throughout your facility in art classes, industrial design, science, and much more. It adds instant options for creative curriculum in your school.

Imagine.

 Roland®

**Roland Vinyl Cutters** - Offering plug-and-play ease, technological sophistication, compact convenience, and the reliability you expect from Roland, our high performance vinyl cutters accelerate your ability to create professional signs, displays, vehicle graphics, decorated apparel and window tinting. Each comes with all the hardware and software you need to get started immediately — right out of the box.



### Roland Offers a Wide Selection of Cutters:

- CAMM-1 GR Series Large Format Cutters
- GS-24 Desktop Cutter
- STIKA Desktop Design Cutter



# ARTS & COMMUNICATIONS CLUSTER: C.I.P. 50.0402 COMMERCIAL & ADVERTISING ART C.I.P. 10.0399 GRAPHIC COMMUNICATIONS, OTHER



## Flatbed Printers



### VersaUV® LEF UV Desktop Flatbed Printers

The LEF Series UV Flatbed Printers offer students countless customization and printing possibilities. They enable direct printing on a wide range of materials that include metal, glass, wood and canvas. White ink and Clear ink options allow for special embossed finishes. Available in 30"x13", 20"x13" and 12"x11" sizes.

## Printers and Cutters



### VersaStudio BN-20 Desktop Printer/Cutter

One compact device for apparel, packaging, posters and more - features 8-channel printheads for outstanding photographic and vector output.

### TrueVis SG2 Series Printer/Cutters

Designed for both novice and advanced users, the new TrueVis SG2 series printer/cutters offer all the quality and versatility of a Roland, at an unbeatable price. Available in 30", 54" and 64" models.



## Dye-Sublimation Printers

### Texart XT-640 and Texart RT-640 Dye-Sublimation Printers

Sportswear, fashion, decor, Point-of-Sale (POS) displays, tradeshow exhibits and a wide range of promotional products are just a few of the many opportunities available in dye sublimation printing. The Roland Texart dye-sublimation printers were designed to provide superb quality, productivity and value with ease of use.

## Roland Project Based Learning The Ready-to-Teach and Easy-to-Learn Solution

Roland's step-by-step tutorials work seamlessly with Roland software and machines, making it easy for educators to teach and for students to learn design and engineering skills.

### Project Based Learning modules are available for:

- Vinyl Cutting with GS-24
- Print & Cut with BN-20 or SG Series
- UV Printing with LEF Series
- 3D Milling with MDX / SRM Series Mills



# MANUFACTURING CLUSTER: C.I.P. 48.0703 CABINETRY & MILLWORK



## Forest Scientific Corporation

Forest Scientific Corporation manufactures high-quality CNC Routers, Mills & Lathes, and Plasma Cutters that are the perfect choice for your school. Made right here in the USA and made to last, each machine has precision THK linear ways and bearings to ensure stability; welded steel frames and structural aluminum to ensure alignment over time; and powerful stepper & servo motors to increase reliability and high resolution on each pass.

They are designed to be updated inexpensively as technology changes and all machines use industry standard Fanuc-style G&M codes from CAM packages such as Mastercam, Surfcam, Edgecam, Vcarve, Fusion 360, SolidWorksCam and more.

To ensure that you have successful results, Forest Scientific offers on-site training as well as Project Based Learning curriculum and tutorials with written and video modalities for teachers and students.

Invest with confidence knowing that you have purchased a Forest Scientific CNC system that is of high quality, well supported, and ensures your success in teaching marketable skills.



### Available products include:

- **FabBot Series Routers and Plasma Cutters** - *Created for home shops and schools on a very limited budget*
- **Convert-A-Table Plasma Cutter/Routers** - *Easily changes from a CNC Router to a CNC Plasma Cutter*
- **Maker-Fab Series Routers and Plasma Cutters** - *Cost effective, heavy duty machines*
- **HS Series Router and Plasma Cutters** - *Standard model for education and small shop*
- **The Michaelangelo 3D Modeler** - *Innovative CNC Router designed for classroom use*
- **The LuthierMax Series Guitar Making CNC Routers** - *Designed in collaboration with engineers from Fender Guitars and [www.guitarbuilding.org](http://www.guitarbuilding.org)*
- **The Mitey Series** - *Machines for educational training, prototyping, design, and production worldwide*

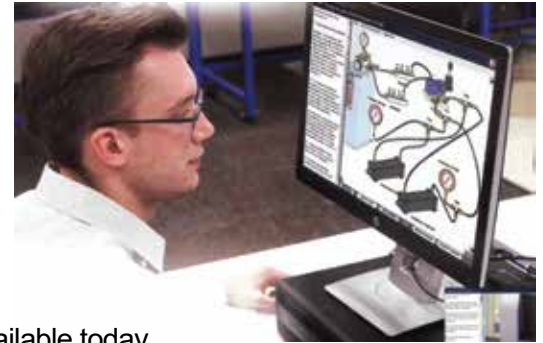


# MANUFACTURING CLUSTER: C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY / ELECTROMECHANICAL ENGINEERING TECHNOLOGY

## **IGNITE** Mastering Manufacturing

### IGNITE Mastering Manufacturing

IGNITE Mastering Manufacturing provides students with the knowledge to fill some of the highest paying and most satisfying career opportunities available today. IGNITE Mastering Manufacturing, a 4-course series, helps students develop the breadth and depth of technical skills they need to excel in this fast-paced and constantly changing field.



### Turn-Key Solution for Advanced Manufacturing

These courses include interactive multimedia course materials, hands-on equipment, teacher materials and training to make course implementation easy and effective. The Advanced Manufacturing Program prepares students to pursue careers in the technology-driven world of modern manufacturing. With the opportunity to obtain industry-recognized certifications from MSSC, students can present themselves to potential employers confident in their abilities to provide an immediate contribution to the organization.

#### Program Courses:

- Materials Science - The Hook
- Introduction to Advanced Manufacturing
- Advanced Manufacturing Systems 1
- Advanced Manufacturing Systems 2

#### Key Features:

- Promotes Exciting Careers
- Introduction to Technologies in Modern Manufacturing
- Skills-Based with College Credit
- Hands-On with Real World Equipment
- Interactive Multimedia/Simulation Learning



## INDUSTRY4.0

### Amatrol – Industry 4.0

Industry 4.0 technologies are rapidly transforming how people work in manufacturing, engineering, and other industry sectors, helping them to become more productive by connecting cloud-based and mobile data analytics software to smart devices; Industry 4.0 integrates the cyber world with the physical world.

Amatrol is offering a four-course series designed to introduce high school and college students to Industry 4.0 and prepare them to pursue exciting careers related to this technology.

Courses include interactive multimedia course materials, hands-on training, teacher materials and training to make course implementation easy and effective.



#### Introductory Industry 4.0 Courses:

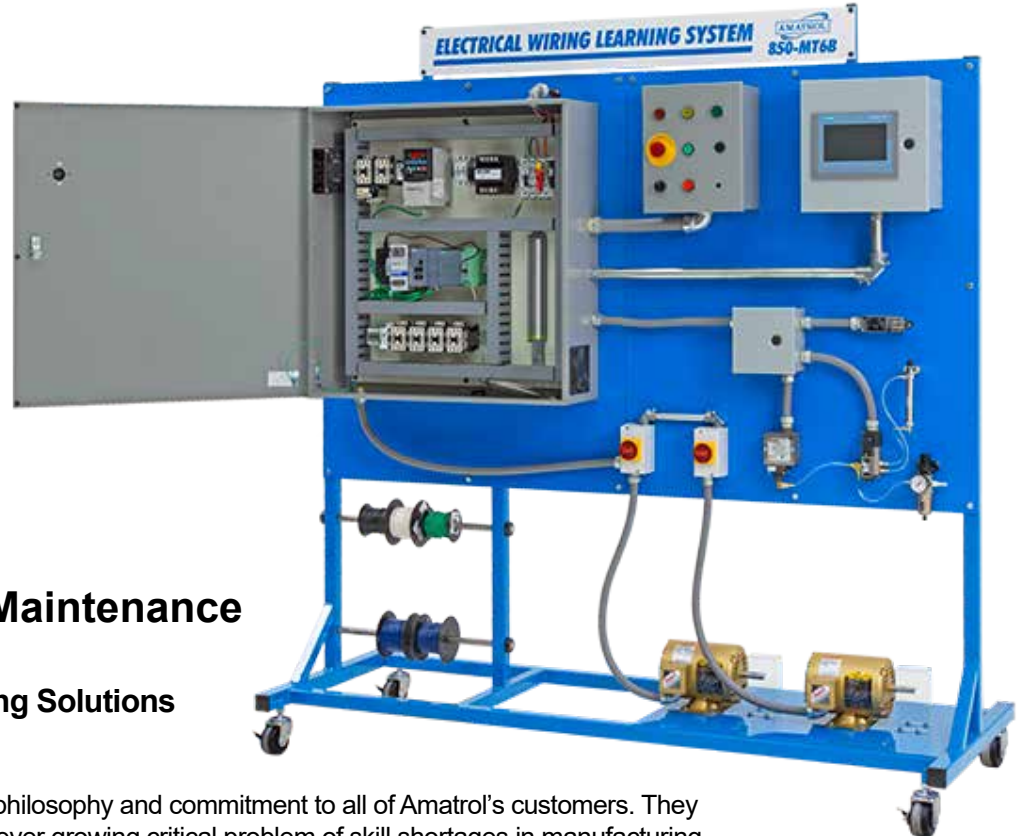
- Mechatronics
- Industrial Control Systems
- MSSC Certification
- Industrial Internet of Things

#### Key Features:

- Prepares for Exciting Careers
- Introduction to Industry 4.0 Systems
- Skills-Based
- Hands-On with Advanced Industry Equipment
- Taught by Certified Faculty
- Interactive Multimedia to Support Learning

# MANUFACTURING CLUSTER:

C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY /  
ELECTROMECHANICAL ENGINEERING TECHNOLOGY



## Amatrol – 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, 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

# MANUFACTURING CLUSTER: C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY / ELECTROMECHANICAL ENGINEERING TECHNOLOGY

## 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



## Smart Factory

- Robotics
- PLC's
- Mechatronics



# MANUFACTURING CLUSTER: C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY / ELECTROMECHANICAL ENGINEERING TECHNOLOGY



MANUFACTURING  
SKILLS STANDARDS  
COUNCIL

**Allegheny Educational Systems provides the MSSC Student eLearning Curriculum and Instructor Authorization Training for the following certifications:**

**Certified Production Technician (CPT):**

- Safety
- Quality Practices & Measurement
- Manufacturing Processes & Production
- Maintenance Awareness
- Green Production

**Certified Logistics Technician (CLT):**

- Foundational-Level Associate Certificate (CLA)
- Mid-Level Technical Certification (CLT)

## MSSC – Manufacturing Skills Standards Council

### Certifying the Industrial Athlete of the Future

The Manufacturing Skill Standards Council, a 501(c)3 non-profit, is an industry-led training, assessment and certification system focused on the core skills and knowledge needed by the nation's front-line production and material handling workers. The nationwide MSSC System, based upon industry-defined and federally-endorsed standards, offers both entry-level and incumbent workers the opportunity to demonstrate that they have acquired the skills increasingly needed in the technology-intensive jobs of the 21st century.

## Amatrol – Skill Boss

### Performance-Based Assessment & Hands-On Training

Skill Boss provides the tool you need to teach or evaluate an individual's skills as they install, adjust, & troubleshoot components on this fully functional mechatronics system, applicable to both discrete parts & process manufacturing.

Designed to meet **MSSC** standards, Skill Boss is a hands-on skill training & assessment system that integrates seamlessly into any manufacturing program and is required for **CPT Plus** certification.



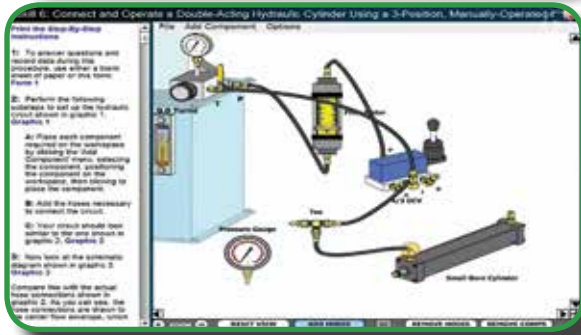
# MANUFACTURING CLUSTER: C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY / ELECTROMECHANICAL ENGINEERING TECHNOLOGY



## 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  
Programmable Controllers  
Electrical • Fluid Power • Machining • Plastics



## Amatrol – e-Assessment Identify Employee Skill Gaps for More Efficient Training

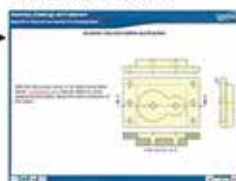
### Step 1 - Assess



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

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193	Identify the main components of a manual switch.	100%	Pass
194	Identify the main components of a manual switch.	100%	Pass
195	Identify the main components of a manual switch.	100%	Pass
196	Identify the main components of a manual switch.	100%	Pass
197	Identify the main components of a manual switch.	100%	Pass
198	Identify the main components of a manual switch.	100%	Pass
199	Identify the main components of a manual switch.	100%	Pass
200	Identify the main components of a manual switch.	100%	Pass

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



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

# MANUFACTURING CLUSTER:

C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY /  
ELECTROMECHANICAL ENGINEERING TECHNOLOGY



## Industrial Technology Maintenance Certifications

Addressing the Critical Need for Skilled Maintenance Technicians, NIMS has Created  
Nine Stackable Certifications in Industrial Technology Maintenance (ITM)

### Industrial Technology Maintenance Certifications

*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 System
- **Duty Area 8** Maintenance Welding
- **Duty Area 9** Maintenance Piping

**Stackable Credentials -  
Learn & Earn at the Same Time!**

***Credentialing Requires Theory  
& Hands-On Assessments***

**NIMS has endorsed Amatrol's  
eLearning Suite; Developed  
Specifically to Support and  
Align with All Nine Areas of the  
NIMS ITM Certification**







## Industrial Technology Maintenance eLearning

eLearning Exclusively Endorsed by



### Interactive Curriculum Engages Learners

- Dynamic Problem-Solving Interactions
- Various Techniques Maximize Learning
- Basic to Advanced Knowledge Building
- Industry-Relevant Procedures
- Covers all Nine ITM Duty Areas
- Topic-Based Modules Target Duty Areas
- Vivid 3D Graphics & Animations
- eLearning Provides 24/7 Access



**Comprehensive Interactive Multimedia  
for Individual, Self-Paced or  
Group Learning Flexibility**

*On-The-Job Training Manuals  
& Instructor's Guides Available  
for Each Duty Area*

# MANUFACTURING CLUSTER:

C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY /  
ELECTROMECHANICAL ENGINEERING TECHNOLOGY



## Amatrol – Smart Factory

Amatrol's "Smart Factory" is a fully connected and flexible manufacturing system that connects its physical systems, operational information, and human assets to control manufacturing, maintenance, inventory, and supply chain operations. Amatrol's in-depth curriculum teaches all aspects of smart factory maintenance and operation in a self-directed, interactive format.

### Smart Sensors

Amatrol utilizes multiple smart devices on the Smart Factory that communicate via Ethernet and I/O Link protocol providing flexible manufacturing, predictive maintenance, and data analytics capabilities.



### Smart Product ID

Amatrol's Smart Factory incorporates smart product identification devices, such as vision systems and bar code readers, which trigger "intelligent" actions including parts tracking, production history, sorting, part accept/reject, and inventory control.

### Network Communications

Amatrol's communication system connects students with a fully functional production system using industrial protocols, for real-time control, program transfer, data collection, and changing programs on the fly.



### Network Security

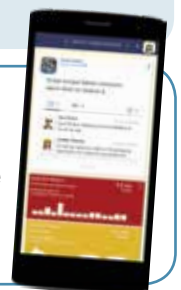
Amatrol's network security system teaches how to keep data safe and securely extend operational data to suppliers and customers. Communications security protects the smart factory from unauthorized outside access and provides secure data communications between the plant-wide network and the internet.

### Smart Production

Amatrol's Smart Production software teaches how smart factories perform customized (personalized) manufacturing and make data and data analytics available via the internet to improve system performance. Amatrol's Smart Factory assembles a pneumatic valve in various configurations on orders entered. The valve can be ordered with a plastic or metal valve body and either a 3-way or 4-way spool.

### Smart Maintenance

Smart Maintenance software utilizes smart device information to automatically trigger maintenance operations. Amatrol's Smart Factory uses industry standard software to connect users directly to the automated system and each other to create a real-world environment where maintenance team members can collaborate to resolve issues quickly and effectively.



# MANUFACTURING CLUSTER: C.I.P. 15.1301 DRAFTING & DESIGN TECHNOLOGY/TECHNICIAN



## Studio System+

The Desktop Metal DM Studio System+ is the world's first affordable, office-friendly metal 3D printing system. Safe and simple to use, the DM Studio System+ was designed to bring metal 3D printing to the shop floor by allowing engineering and design teams to make metal parts faster, without the need for special facilities or dedicated operators.



## The Desktop Metal difference

The DM Studio System+ printer is similar to the safest and most widely used 3D printing process, Fused Deposition Modeling (FDM). Unlike laser-based systems, the DM Studio System+ printer extrudes bound metal rods - similar to how plastic FDM printers work. This eliminates safety and facility requirements associated with traditional metal 3D printing, while enabling new features like closed-cell infill for lightweight strength.



### Print

The Studio System+ printer extrudes bound metal rods, shaping the "green part" through Bound Metal Deposition™. This process is similar to the safest and most widely-used 3D printing process—Fused Deposition Modeling (FDM) and eliminates safety concerns associated with metal 3D printing.



### Debind

The green part is transferred to the Studio System+ debinder where it is immersed in Desktop Metal's proprietary debinding fluid. The primary binding material is removed in order to prepare the part for sintering. The debinder is safe for use in an office environment and does not require any external ventilation.



### Sinter

The Studio System+ furnace heats parts to just below their melting point, fusing metal particles to form fully dense parts without residual stresses introduced in laser-based processes. Fully automated and sized to fit through a doorway, the furnace delivers industrial-strength sintering in an office-friendly package.

# MANUFACTURING CLUSTER: C.I.P. 15.1301 DRAFTING & DESIGN TECHNOLOGY/TECHNICIAN

**formlabs** 

AUTHORIZED PARTNER

## Formlabs SLA 3D Printers

Engineered for precision.  
Designed for reliability.



Formlabs SLA 3D Printers are desktop stereolithography (SLA) 3D printers ideal for applications such as product design, manufacturing, dental, healthcare, education, entertainment, jewelry, and more. Formlabs printers have been engineered for precision and designed for reliability - offering industrial output at a desktop price. They are extremely versatile with a wide array of photopolymer resins for a full variety of applications and possibilities.



### Form 3

*Flawless Prints, Every Time*

The Form 3 LFS (Low Force Stereolithography) 3D printing balances detail and speed, while the optical system maintains a precise, dense laser spot to ensure accurate, repeatable prints. Easy clean-up and smoother parts with tear-away light-touch supports.

Build Volume: 5.7 x 5.7 x 7.3 in  
Laser Power: 1x 250 mW laser

### Form 3L

*Bring Large Format 3D Printing In-House*

Blaze through large parts with two custom-designed Light Processing Units (LPUs). Two lasers simultaneously build large, dense parts fast. Use two of the same resin cartridges that are used by Form 2 and 3 to go longer without running out of resin. Switch seamlessly between 20+ general purpose and specialty resins with the cross-compatible cartridge system.

Build Volume: 13.2 x 7.9 x 11.8 in  
Laser Power: 2x 250 mW laser



*Small Details, Big Results*

Eliminate the turnaround time of outsourcing of the manual work of assembly for large scale 3D prints. The Form 3L offers a massive build volume at an unprecedented value.

# Ultimaker

## Fueling Innovation-driven Education

Ultimaker's products and solutions encourage students to address real-world problems, regardless of the grade level.

It's Ultimaker's goal to set the engineers, artists, and designers of the future on the right path, and to support their learning along the way.



## Design freedom with industrial-grade materials

Ultimaker's range of materials are formulated to achieve superior results. Optimized Cura profiles offer the best print settings per material and recognize which print core and material you're using. The open filament system lets you experiment with new materials and test the latest market developments.

## The world's most advanced 3D printing software

Cura is a free, open-source slicing software solution, designed to produce reliable, high-quality print results. Ultimaker's preconfigured Cura profiles ensure a seamless printing experience, with auto-adjust functionality per material and print core.



## Ultimaker 3 and Ultimaker 3 Extended Professional 3D printing made accessible

Engineered for efficiency, reliability and precision, the Ultimaker 3 features dual extrusion with water-soluble support, advanced connectivity, and an open filament system. Optimized Cura profiles include: Nylon, PLA, Tough PLA, ABS, CPE, PVA, CPE+, TPU 95A, PC, PP, and Breakaway. Ultimaker 3 build volume 8.5 x 8.5 x 7.9 in.; Ultimaker 3 Extended build volume: 8.5 x 8.5 x 11.8 in.

## Ultimaker S5 Powerful. Reliable. Versatile.

The Ultimaker S5 combines dual extrusion, advanced connectivity, and an open filament system with a large build volume for a classroom-friendly 3D printer, offering unrivaled quality and reliability at scale. Print with a wide range of engineering materials and easy-to-remove support. The Ultimaker S5 is optimized for Nylon, PLA, Tough PLA, ABS, CPE family, PVA, PC, TPU 95A, PP, and Breakaway. Build volume: 13 x 9.4 x 11.8 in.



# MANUFACTURING CLUSTER: C.I.P. 15.1301 DRAFTING & DESIGN TECHNOLOGY/TECHNICIAN



SolidWorks offers the best suite of tools for engineering design, documentation, simulation, and sustainable design in one easy-to-learn software package.

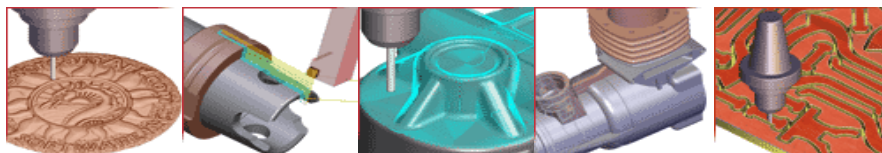


Certification and experience with SolidWorks is an in demand skill. Making 3D designs that can be exported to a 3D printer, gives students a glimpse into taking a product from design to testing. In today's competitive job market, CAD professionals need every advantage they can get, and the SolidWorks Certification Program gives your students a proven edge. Solidworks offers a host of resources for education and a Solidworks Certification course that can help get your students into careers. Solidworks offers tutorials and specialized curriculum for educators (Including: robotics, STEM, medical, machinery, F1, Formula SAE, and a host of other topics!).



Mastercam delivers CAD/CAM software tools for all types of programming, from the most basic to the extremely complex. 2-axis machining, multiaxis milling and turning, wire EDM, router applications, free-form artistic modeling and cutting, 3D design, drafting, surface and solid modeling – whatever your machining needs, there is a Mastercam product for your budget and application.

There are more curricula available for Mastercam than any other CAM system. The Educational Division continually provides exceptional teacher training and educator support. Years of experience in the educational market has helped Mastercam to understand the specific needs of instructors, schools, and students. Since Mastercam is the most widely used CAM software in the world, the products are industry proven. Mastercam has been designed for any level of skill or machining. From middle school exploratory classes to a university research lab making complex molds, Mastercam provides the tools to fit the application.



**Vectric** software is designed to make cutting parts on a CNC an enjoyable and productive experience, the combination of power and simplicity lets you efficiently generate or manage your design, then quickly create precise toolpaths to drive your CNC.

#### Products Include:

- **Cut2D** - Vector drawing & editing tools for CNC routing, milling & engraving
- **VCarve** - Complete software solution for cutting on a CNC Router
- **Aspire** - Draw & build 3D component models for machining
- **Cut3D** - Converts 3D models into CNC toolpaths
- **PhotoVCarve** - Converts photos and images into high quality toolpaths for CNC and engraving machines

# MANUFACTURING CLUSTER: C.I.P. 48.0508 WELDING TECHNOLOGY/WELDER



## Forest Scientific HS Series Plasma Models

Forest Scientific Corporation HS-Series Plasma Cutters are heavier duty machines made with a larger tubular welded steel frame with integrated Water Table. The extra rigidity is great for handling the abuse of students and will stand the test of time with 24/7 commercial use. It's Closed Loop Hybrid Servo Control assures accuracy at the fastest speeds.

### Available models:

HSPB 24" x 24"      HSPB 48" x 24"      HSPB 48" x 48"  
HSPB 48" x 96"      HSPB 60" x 120"



## Forest Scientific CRP Clean Room Metal Torch

The Forest Scientific Corporation CRP Clean Room Metal Torch is perfect for Engineering Labs as well as Clean Rooms and is a cost effective alternative to laser and waterjet cutting. The CRP cuts steel, aluminum, copper and brass and is capable of near laser quality fine cutting up to 1/4" steel. It is also able to cut up to 5/8" steel as well as perform low resolution metal marking.



### Featuring:

- Closed-Loop Hybrid Servo Control System
- Dnndraft grid table and ports to exhaust fumes outside or to a filtration system
- Automatic torch height
- Automatic voltage detection, current set from computer
- Includes fine marking and standard cutting consumables

Model	Travel
CRP2418	24" X 18" Y
CRP3618	36" X 18" Y
CRP48X24	48" X 24" Y

*Optional in room filtration system*  
*Optional ultra quiet dry air compressor*

# MANUFACTURING CLUSTER: C.I.P. 48.0508 WELDING TECHNOLOGY/WELDER



## 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!

#### Featuring:

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





# MANUFACTURING CLUSTER: C.I.P. 48.0508 WELDING TECHNOLOGY/WELDER



## 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.

## Robotic Education Cell 2.0

Lincoln Electric® offers advanced manufacturing training solutions. With automated welding transforming manufacturing today, our complete offering of robotic welding training solutions focus on enhancing the ability to train students on robotic programming and welding techniques and skills. Our goal is to help welding, robotic and manufacturing technology instructors and students to develop the skills necessary to thrive in an advanced manufacturing environment.

### Ideal For:

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



## Introducing U/LINC

U/LINC is the only welding education program of its kind. The curriculum system supports an ideal learning process for both students and instructors. Connecting theory, practice and knowledge in an accessible web-based package, U/LINC is backed by the Lincoln Electric legacy of excellence in welding, manufacturing and welding education.

### The Curriculum Includes:

Lesson Plans • Videos • Student Reference Guides • Lab Activities • Class Presentations • Student Handouts • Assessment Tests • Cumulative Learning Records • Accessible and Robust Web-based Program

# MANUFACTURING CLUSTER: C.I.P. 15.0403 ELECTROMECHANICAL TECHNOLOGY

# FANUC



## FANUC's CERT Certified Education Robot Training

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.

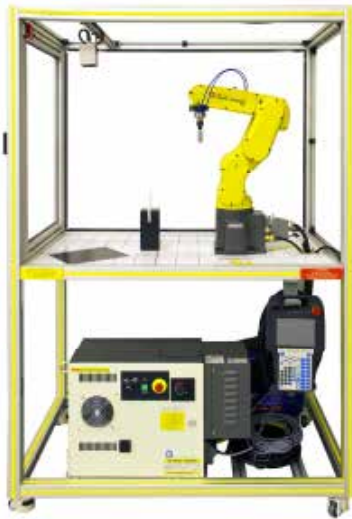
### CERT Program Features

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).

### Optional:

iRVision CERT Instructor Program

- 2D integrated iRVision software, camera & cable
- Web and live training course on vision setup and operation
- Project Based Learning
- Force Sensor
- Conveyor (in bound/out bound)
- Vision lighting kit
- Custom solutions incorporating any FANUC robot
- Dual robot material handling system



## National Certifications for Robotics and Advanced Automation Manufacturing



FANUC introduces the first ever National Certifications for Robot Operations, Programming and Integrated Vision. These new certifications provide students with the opportunity to learn core competencies and automation technology skills for today's manufacturing industry. With these thorough national certification assessments, students and workers are able to document their knowledge and fill high demand, high paying, and exciting career opportunities in Robotics and Advanced Manufacturing.

The skills and knowledge required to obtain these new national certifications are delivered through the largest network of well-established secondary and post-secondary schools and training institutions offering FANUC CERT (Certified Education Training) programs with hands-on applied technology in robotics and advanced manufacturing.

- FCR-O1 FANUC Certified Robot Operator-1**
- FCR-O2 FANUC Certified Robot Operator-2\***
- FCR-T1 FANUC Certified Robot Technician-1\***
- FCR-T2 FANUC Certified Robot Technician-2\***

*\*Certifications marked with an asterisks are not yet available but will be soon.*



## FANUC



### FANUC CR-35iA Collaborative Robot

#### Features

The FANUC CR-35iA Robot is a 35kg payload collaborative robot that can work without safety fences.

#### Collaborative Operation

- Operates in close proximity to humans in a shared workspace without safety fences.
- Works in cooperation with a human operator. (example: heavy workpiece transfer, parts assembly)

#### Safety Function

- Stops safely when it comes in contact with a human operator.
- Safe and gentle green cover reduces impact forces and pinch points by providing a soft barrier between a human operator and the robot arm.
- Certified to meet the requirements of international standard ISO 10218-1.

#### Intelligence and High Reliability

- Latest intelligent functions such as iRVision (Integrated vision) are available.
- The CR-35iA is designed and built with the precision and reliability of all FANUC robots.



### FANUC LR Mate 200iD/4S Fenceless CERT Cart

The NEW FANUC LR Mate 200iD/4S FENCELESS CERT Cart was developed from combining FANUC DCS Position and Speed Check software with an Allen-Bradley SafeZone Mini Safety Laser Scanner. The result is FANUC's NEW FENCELESS Cart that will still fit through a standard door and runs off 110V power. The FENCELESS cart allows a greater work envelope and introduces students to the latest in integrated safety products from FANUC and Allen-Bradley.

#### Features Include:

- Can accommodate either LR Mate 200iD or LR Mate 200iD/4S
- 180+ degree work envelope
- Space on worktable for all PBL kits: Including Shapes and optional PBL kits (Battery, Pill, and New Palletizing blocks)

# MANUFACTURING CLUSTER: C.I.P. 48.0501 MACHINE TOOL TECHNOLOGY/MACHINIST



## FANUC

### Fanuc's CNC Simulator

FANUC CNC Simulator brings the world's most popular CNC control to the classroom, providing students with exposure to FANUC CNC controls without the need for a full machine. The FANUC CNC Simulator is based on the FANUC Series 0i MODEL F platform and can be operated in either milling or turning configurations.

#### Features

- Switchable mill and lathe (turning) system in one simulator
- 3-axis milling / 2-axis turning system plus one spindle
- Manual Guide *i* for conversational program creation and 3D simulation
- USB, Flash ATA and Ethernet connectivity

The FANUC CNC Simulator is an actual FANUC CNC control, so students will experience the look, feel and layout of the control as they navigate and program a fully functioning CNC. FANUC's MANUAL GUIDE *i* conversational programming interface allows users to graphically generate programs that are simulated in 3D prior to being converted back to conventional NC programs and used on machine tools. Uploading and downloading (read and punch) functions are facilitated by means of the standard Flash ATA interface and USB interface, and DNC functions are supported by Ethernet and Flash ATA card.

### 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



# TRANSPORTATION, DISTRIBUTION & LOGISTICS CLUSTER:

C.I.P. 47.0302 HEAVY EQUIPMENT MAINTENANCE TECHNOLOGY/TECHNICIAN

## SIMLOG

### 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. Choose 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.

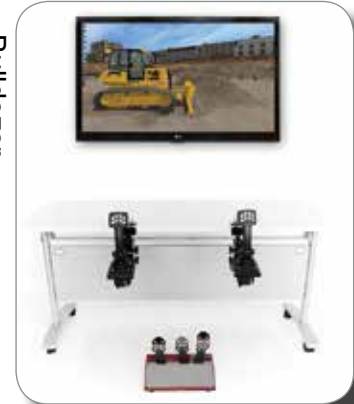
With Simlog, your students will be learning the right way to do things, thanks to "best practices" input from our OEM partners and training professionals just like you. So you'll find the right kind of simulated tasks, the right kind of task progression, and the right way of evaluating the simulated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



Bulldozer



Hydraulic Excavator



Forklift



Wheel Loader



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

# TRANSPORTATION, DISTRIBUTION & LOGISTICS CLUSTER:

C.I.P. 47.0603 AUTOBODY/COLLISION AND REPAIR TECHNOLOGY/TECHNICIAN



## SimSpray

SimSpray is an immersive virtual reality painting simulation. Designed to augment traditional educational methods, it assists in the teaching of spray painting and coating fundamentals.

Using SimSpray saves on training time and decreases expenses, delivering a “Green” ROI to training organizations.



### SimSpray Features:

- Experience realistic 3D stereoscopic spray paint simulation
- Learn correct body positioning, movement for proper painting and coating techniques
- Reinforce proper equipment setup
- Paint entire parts with primer, color, and clear coats
- See visual defects including:
  - Dry spray
  - Orange peel
  - Drips/sags
- Accelerate learning through innovative scoring and feedback
- Spray paint with a proprietary gun that includes:
  - Working fan pattern and fluid adjustment knobs, with horizontal or vertical spray cone orientation
  - Two-part trigger
  - Haptic feedback



# S.T.E.M. CLUSTER: C.I.P. 15.0399 ELECTRICAL & ELECTRONICS

## LJ Create ETA Electronics Certification

LJ Create's self-contained electronics program gives you all the resources you need to teach a complete electronics course. This compact solution includes an electronics trainer and a range of interchangeable cards, providing quick and easy hands-on learning for students of all abilities. LJ Create's trainer is the perfect blend of component based and systems training, including a project-based circuit construction and troubleshooting.

### BRAND NEW CERTIFICATION PROGRAM

- 100% standards coverage: everything you need to teach a complete SET program.
- Quick and easy hands-on learning for students of all abilities.
- Perfect blend of component-based and systems training.
- Detailed, pre-prepared, 4-block course.
- Includes tracked formative and summative tests.

320 Series  
Electronics  
Trainer

Durable Discrete  
Components

320 Series Cards

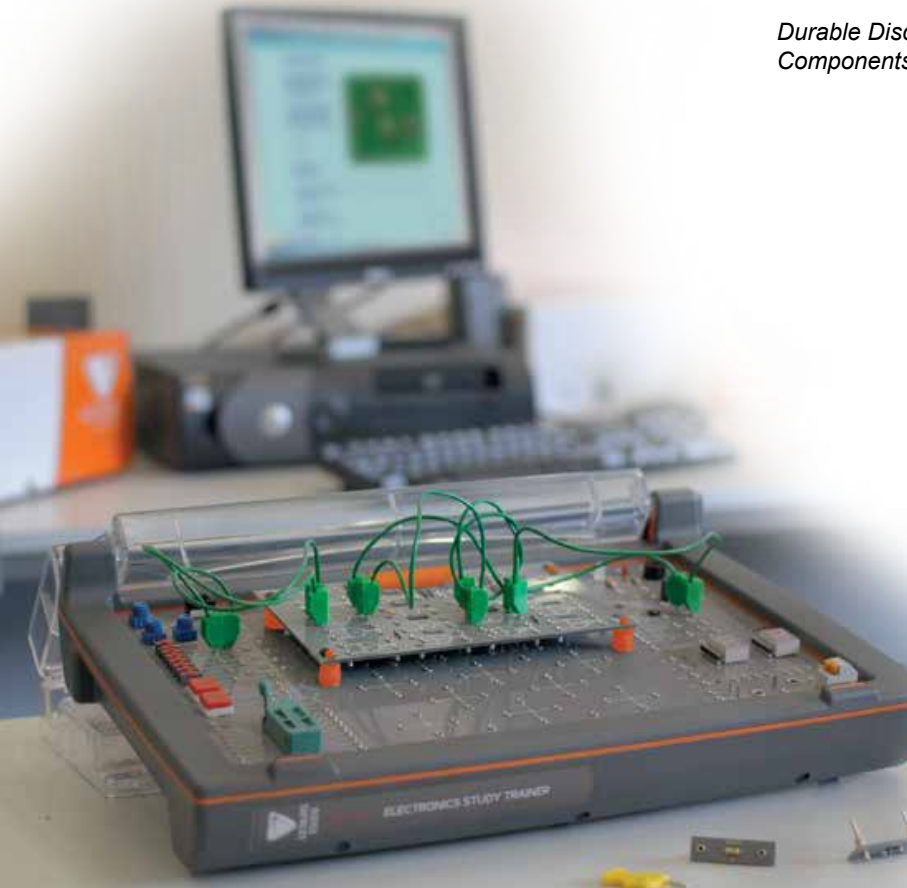
Complete  
Program  
for Student  
Electronics  
Technician (SET)

### Featuring a brand new electronic systems trainer

- Flexible trainer for teacher demo, group work, and independent learning.
- Portable for any classroom: no need for a dedicated electronics lab.
- Start building circuits in 30 seconds, stack to store when lesson is over.



**LJ CREATE™**  
Learning for life



# S.T.E.M. CLUSTER: C.I.P. 15.0399 ELECTRICAL & ELECTRONICS

## LJ Create Mechatronics Programs

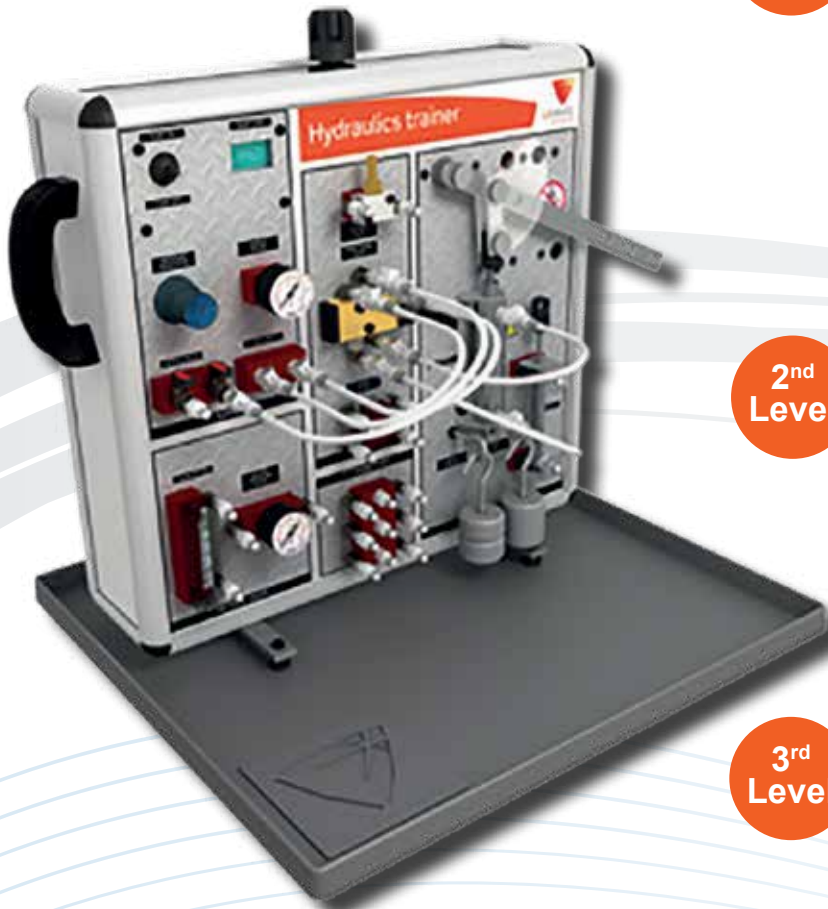
### Prepare your students for success in Mechatronics

LJ Create Mechatronics is a set of courses at three levels, designed to provide students with a strong foundation in mechatronic principles and applications.

The courses will provide students with the expertise they need to succeed in industrial skills programs and industry certification courses.



**LJ CREATE™**  
Learning for life



1<sup>st</sup>  
Level

#### Foundation Mechatronics

Short project-based courses that explore basic mechatronic principles. Investigate the application of mechatronics in a wide range of different career clusters:

- Engineering Design
- Mechatronic Systems
- Computer Science
- Electrical Technology
- Capstone Robotics Project

2<sup>nd</sup>  
Level

#### Mechatronic Systems

Courses teaching the basic principles of the technologies used in mechatronic systems:

- Engineering Principles
- Mechanical Systems
- Fluid Power
- Electrical and Electronics
- Introduction to Process Control

3<sup>rd</sup>  
Level

#### Advanced Mechatronics

Advanced mechatronics courses that allow students to specialize, and lead towards preparation for an industry certification:

- **Advanced Mechatronics Core** - All students explore advanced mechatronic principles including robotics, production and business concepts.

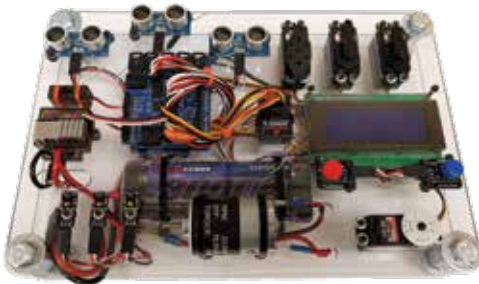




## Minds-i STEM Integrated Robotics

MINDS-i Robotics Education is designed to give students an interactive approach to applied science, technology, engineering and math (STEM). MINDS-i is rocking the Robotics Education world with a high-technology platform that is simple to use, extraordinarily durable, infinitely modifiable, and will prepare students with the skills they need to excel in the 21st century.

MINDS-i inspires a rigorous college and career relevant experience through STEM Robotics in the everyday classroom in a format that can impact each and every student.



### Foundations to Robotics - Breadboard

This teachers resource LAB is designed to accompany the MINDS-i Foundation Curriculum. It is a fully assembled and programmed robotics breadboard designed to aid in teaching programming.

The MINDS-i Breadboard allows the teacher and students to physically interact with the sensors on a stationary platform. It can be used as a quick and easy method for checking students wiring and code.



### MINDS-i Robot - Arduino Robot Kit

The 2-in-1 Arduino kit is the perfect entry point for those interested in programming. Build one of two chassis at a time: the Hexbot or the Line Follower.

The Hexbot uses cam driven legs to navigate around the room avoiding objects with touch sensors. The Line Follower uses "light sensing" QTI sensors to follow a path laid out and ultrasound sensors to avoid obstacles. The set includes easy to use visual instructions for building and programming.

#### Kit Design

Each kit is designed for two to three students and requires about three hours to build and program. The Arduino Robot kit does not include curriculum. See the Foundations Lab and Drones Lab for curriculum.



### Foundations to Robotics - 4x4 and 6x6 Labs Available

The Foundations Labs are introductory courses into the world of STEM and Robotics. Both Labs are designed to be an interactive approach to applied science, technology, engineering and math. Students will become familiar with the basics of robotics and programming in a team based environment.

#### Course Design

Each Lab is one semester (90 Hour), and is designed for three to five students. The Foundations Labs are the recommended prerequisites to the Drones Lab + Curriculum.



## MINDS-i Drone Curriculum - UAV XL Drones Lab

The MINDS-i Drone Curriculum is designed to teach students the complex systems of drone technology aligned with 21st century teaching standards. Designed as an interactive approach to applied learning, students will explore the fields of science, technology, engineering, and math. Students will become familiar with the basics of drone systems, robotics, and programming in a team based environment.

### Curriculum Outline:

Each lab is designed for three to five students and includes a half semester (45 Hours) of lesson plans and materials. Foundations is the recommended prerequisite to the MINDS-i Drone Curriculum.

## MINDS-i Drones Lab and Curriculum

### *UAV Mini + UGV Drones Lab and UAV XL + UGV Drones Lab Available*

The MINDS-i Drones Lab and Curriculums are an introduction into the world of Drones and Robotics. It is designed as an interactive approach to applied science, technology, engineering and math. In these courses, students will become familiar with the basics of Drone robotics and programming in a team based environment.

### Course Design

Each Lab is one semester (90 Hour), and is designed for three to five students. The Foundations Labs are the recommended prerequisites to the Drones Lab + Curriculum.

### UAV Mini + UGV Drones Lab



### UAV XL + UGV Drones Lab





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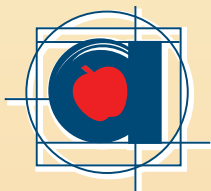
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