

# TEACH YOUR TRADE.

WE'LL DO THE REST.

**ENROLLMENT  
IN SKILLED  
TRADE  
PROGRAMS  
IS UP 70%.**



**IS YOUR WORKFORCE DEVELOPMENT  
CURRICULUM READY?**

*Credit: Texas State Technical College Welding Program – The Wall Street Journal*

**U/LINC**  
INSTRUCTION ENGINEERED by LINCOLN ELECTRIC

# TEACHING WELDING MATTERS. NOW MORE THAN EVER.

Automation and advanced technologies, like robotics and plasma cutting make your trade—and the way you teach it—a new ball game. The world is changing. In a globally competitive landscape, the demand for skilled workers is far outpacing the supply.

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**ALMOST TWENTY PERCENT OF SKILLED TRADE WORKERS ARE EXPECTED TO RETIRE IN THE U.S. IN THE NEXT TEN YEARS.**

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The jobs are there. A new generation of students is waiting to be trained in the skilled trades. **Is your workforce development curriculum ready?**

# IT'S TIME FOR A NEW GENERATION OF WELDERS.

Baby boomers have dominated high-demand skilled trades for the last forty years.

*Credit: American Welding Society*

In the U.S., the average welding operator is **57 years old** and close to retirement.

*Credit: American Welding Society*

IN THE NEXT DECADE, A SHORTAGE IN SKILLED TRADE WORKERS, INCLUDING WELDERS, WILL LEAVE 2 MILLION MANUFACTURING JOBS UNFILLED.

*Credit: Manufacturers Alliance for Productivity and Innovation*

Manufacturing is **12% of the GDP** and growing.

*Credit: United States Department of Commerce, Economics & Statistics Administration*

# 82%

OF MANUFACTURING EXECES SAY A GAP IN SKILLED TRADES WILL IMPACT THEIR ABILITY TO MEET CUSTOMER DEMAND.

*Credit: Manufacturers Alliance for Productivity and Innovation*

# INTRODUCING U/LINC

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**TAKE THE GUESS WORK OUT OF LESSON PLANNING AND CURRICULUM DEVELOPMENT.**

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U/LINC is a complete curriculum of lesson plans, videos, student handouts, tests, presentations and more designed to supercharge your teaching experience and free you from curriculum development.

**TURNING  
EXPERIENCED  
WELDERS INTO  
EDUCATORS  
OVERNIGHT.**



**U/LINC**  
INSTRUCTION ENGINEERED by LINCOLN ELECTRIC

# TEACHER BENEFITS

More than 1,500 assets for a turnkey curriculum

Comprehensive program with teaching aids, lesson plans and lab work

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**NEVER WORRY ABOUT  
LESSON PLANS AGAIN.**

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Easy-to-access, web-based program

Ongoing updates for new techniques and emerging technologies

# STUDENT BENEFITS

A mentorship student/instructor learning experience

Every major welding process taught, including emerging skills

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**GET THE BEST TRAINING IN  
THE INDUSTRY.**

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Tools and training to equip students for a changing industry

Better educated instructors from a trusted brand

# IS YOUR WORKFORCE DEVELOPMENT CURRICULUM READY?





# **KNOW HOW. WE'VE TAUGHT MORE THAN 250,000 WELDERS OVER THE LAST CENTURY.**

**Attract students and instructors with the best curriculum in the industry.**

U/LINC is the only welding education program of its kind. Our 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.

# PROGRAM OVERVIEW

A ROBUST AND SEAMLESS TURNKEY CLASSROOM EXPERIENCE WITH MORE THAN 1,500 ASSETS AND GROWING.

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

**FOR SAFETY**

- Industrial quality safety glasses
- Fire-resistant welder's cap
- Helmet with filter lens
- Ear plugs
- Leather or fire resistant cloth jacket
- Dry, hole-free, insulated welding gloves
- Long pants (no cuff)
- Leather aprons, leggings, capes, and/or sleeves
- NO synthetic (man-made) fabrics
- Leather high-top safety-toed shoes
- Respiratory protection and/or source extraction equipment

[www.lincolnelectric.com/safety](http://www.lincolnelectric.com/safety)

**GMAW Modes of Metal Transfer**

**Introduction**

Having an understanding of the modes of metal transfer characteristics is essential for welding and fabrication. The modes of metal transfer have both advantages and limitations. Choosing the right process for the material to be welded will lead to faster weld times and fewer discontinuities and distortion—thus a more efficiently run fabrication shop. When mistakes are made, it costs the company time and money in rework and repairs. If the mistakes are not caught prior to the part being put into service, it could lead to future weld failure causing possible injury or, in extreme cases, death. Most employers strive to keep their shop running efficiently by employing highly skilled welders to help eliminate any rework or repairs. Welding operators with a strong welding skill set and an understanding as to why a particular mode of transfer is most effective for efficiency and quality will always be in high demand.

**Objectives:**

1. Describe the three basic forms of metal transfer used in GMAW

**Welding Procedure Specification (WPS) Instructor's Key**

Company Name: Sample Identification #: Sample

Date: By: \_\_\_\_\_  
Date: \_\_\_\_\_

Filter:  Flat Surfacing:   
 Up  Down

**CHARACTERISTICS**  
Art Circuit:  Globular  
by:  Pulse

DCEP  DCEN  
 CC  CV

ETAWY: \_\_\_\_\_  
Type: \_\_\_\_\_

Min: N/A Max: N/A  
Min: N/A Max: N/A

**Joint Details**

The Lincoln Electric Company

<b>PROGRAM CONTENTS (by level)</b>	● Included	<b>Level 1</b> [K4244-1 / K4244-2]	<b>Level 2</b> [K4245-1 / K4245-2]	<b>Level 3</b> [K4246-1 / K4246-2]	<b>Pipe</b> [K4247-1 / K4247-2]
<b>CLASSROOM</b>					
Safety		●	●	●	
Principles of Welding - Introductory		●	●	●	
GMAW - Gas Metal Arc Welding - Introductory		●	●	●	
SMAW - Shielded Metal Arc Welding - Introductory		●	●	●	
Thermal Cutting		●	●	●	
Fabrication - Introductory		●	●	●	
Mathematics in Welding		●	●	●	
Careers		●	●	●	
FCAW - Flux-Cored Arc Welding - Intermediate			●	●	
GTAW - Gas Tungsten Arc Welding			●	●	
Robotics - Intermediate			●	●	
CNC Plasma Cutting - Intermediate			●	●	
Manufacturing and Engineering			●	●	
Fabrication - Intermediate			●	●	
Principles of Welding - Advanced				●	
GMAW Aluminum Welding				●	
GMAW Stainless Welding				●	
GMAW Pipe Welding				●	●
SMAW Pipe Welding				●	●
FCAW Pipe Welding				●	●
Robotics - Advanced				●	
CNC Plasma Cutting - Advanced				●	
<b>LAB</b>					
SMAW Stringer, 2F, 3F		●	●		
SMAW 1G, 2G, 3G			●		
GMAW Pulse 2F, 3F, Short Arc 4F 10 Ga., 1G, 2G, 3G			●		
GMAW Aluminum 2F, 3F, 1G, 2G, 3G			●		
GMAW Stainless Steel 2F, 3F			●		
GTAW 2F, 3F on all materials, pulse and non-pulse			●		
FCAW-G, FCAW-S Flat, 2F, 3F, 1G, 2G, 3G			●		
SMAW - 4F, 4G				●	
GMAW Pulse 3F .035 in. Wire Dia., Pulse 4F, Pulse 4G				●	
GMAW Stainless Steel 1G, 3G				●	
GTAW 4F, 1G, 2G, 3G, 4G on all materials, pulse and non-pulse				●	
FCAW-G, FCAW-S 4F, 4G				●	
Pipe API, ASME1G, 2G, 5G, 6G				●	●

## ORDER INFORMATION

Product Name	Product Number	Minimum Software Requirements
<b>U/LINC CURRICULUM LEARNING MANAGEMENT SYSTEM</b>		
Level 1 Curriculum - Introduction (individual license)	K4244-1	Microsoft® Explorer® 10 web browser or higher or similar from other browser suppliers. Adobe® Flash® 10.0 or higher is recommended.
Level 1 Curriculum - Introduction (multiple licenses)	K4244-2	
Level 2 Curriculum - Intermediate/High School (individual license)	K4245-1	
Level 2 Curriculum - Intermediate/High School (multiple licenses)	K4245-2	
Level 3 Curriculum - Advanced/Community College (individual license)	K4246-1	
Level 3 Curriculum - Advanced/Community College (multiple licenses)	K4246-2	
Pipe Welding Curriculum (individual license)	K4247-1	
Pipe Welding Curriculum (multiple licenses)	K4247-2	

Contact your local Lincoln Electric representative for price quotation.

### CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company® is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to [www.lincolnelectric.com](http://www.lincolnelectric.com) for any updated information.