



**JARC**

JANE  
ADDAMS  
RESOURCE  
CORPORATION

# ***Business and Workforce Services***

**Course Catalog**

**Customized Worker Training Classes**

Chicago Training Center  
4222 N. Ravenswood  
Chicago, IL 60613  
773-751-7109  
E-mail: [bws-chi@jane-addams.org](mailto:bws-chi@jane-addams.org)  
[www.jane-addams.org](http://www.jane-addams.org)

Baltimore Training Center  
4910 Park Heights Ave.  
Baltimore, MD 21215  
410-900-1446  
E-mail: [bws-bltd@jane-addams.org](mailto:bws-bltd@jane-addams.org)  
[www.jarcbaltimore.org](http://www.jarcbaltimore.org)



## High-quality skills training for the manufacturing sector

**Jane Addams Resource Corporation (JARC)** is a nationally recognized leader in training and workforce development for the manufacturing sector.

JARC's training programs target strategic skills gaps in advanced manufacturing and metal fabricating such as CNC machinist, welder and press brake operator.

### ■ **Careers in Manufacturing Programs**

provide job training and employment services for unemployed adults, including jobseekers with barriers to employment. (See pages 20-21.)

### ■ **Business and Workforce Services**

designs and executes customized worker training for manufacturing companies and their employees. (See course list on page 1.)

JARC has developed a new model of customized, employer-driven programs that weave together coursework, demonstration of hands-on competencies, and relevant industry credentials.

JARC's training programs are intended to provide resources and services from entry-level hiring to performance improvement to support career advancement and growth.

This catalog summarizes JARC's services. We look forward to working with your team to provide effective workforce strategies.

## How do I get started?

Contact JARC's Business and Workforce Services team to discuss your hiring and training needs. See contact information below.

JARC will take the time to understand your manufacturing processes, technologies and culture in developing high-quality workforce solutions that align with your business goals.

## Contact JARC Business Services



JANE  
ADDAMS  
RESOURCE  
CORPORATION

### Chicago

773-751-7131

E-mail: [bws-chi@jane-addams.org](mailto:bws-chi@jane-addams.org)  
[jane-addams.org/employers](http://jane-addams.org/employers)



JANE  
ADDAMS  
RESOURCE  
CORPORATION  
**BALTIMORE**

### Baltimore

410-900-1441

E-mail: [bws-bltd@jane-addams.org](mailto:bws-bltd@jane-addams.org)  
[jarcbaltimore.org/employers-workforce-services](http://jarcbaltimore.org/employers-workforce-services)

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**Need skilled entry-level workers?**

Inside back cover

# Train your existing workforce

The technological advances of the last 30 years have revolutionized American manufacturing creating new occupations and career paths throughout the sector. The landmark studies by Deloitte and the Manufacturing Institute have established the scale of middle-skills gaps in the labor market. The lack of qualified entry-level workers is a well-acknowledged problem.

What is often overlooked in the workforce is **the prevalence of skills gaps** and the need to train workers to execute new functions in a rapidly evolving workplace. In fact, **51% of respondents in the landmark studies shared that skills gaps among their existing workers was the greater challenge to the bottom line.**

It makes sense. Manufacturing companies are investing in new technologies in order to remain competitive. It is impossible to realize an acceptable return on these investments without qualified personnel to program, set up, operate and maintain the new equipment.

JARC's **Business & Workforce Services** can be a resource for customized worker training. JARC offers dozens of classes in these areas:

- Workplace Safety
- Basic Skills
- Quality Assurance and Quality Control
- Manufacturing Skills
- Lean Manufacturing

## The JARC Advantage

JARC's approach to worker training is hands-on, practical and customer-focused. Essential practices include:

- **Customized Curriculum** – Starting from a basic outline, we customize the curriculum to incorporate your manufacturing processes and technologies, business model and challenges.
- **Flexibility** – JARC can provide training on-site using your equipment, processes, parts and prints. In most cases, JARC can provide training to accommodate 2nd and even 3rd shifts.
- **Industry Pros** – JARC's faculty are recruited from the trades and developed as instructors, not the other way around. JARC's industry professionals engage your workers with a voice that has credibility and weight.
- **Low cost** – JARC's low hourly rates will help you stretch your training budget.

*"I have been involved with JARC for over seven years. JARC is easy to work with and can deliver great results – and the training is reasonably priced. But the main reason to use JARC is because the training is customized. Traditional institutions don't tailor to our needs. CNC machining is a broad field. If we're going to invest in training, it needs to be customized to our needs."*

**—Carl Ollerer, Human Resources and Health, Safety Environmental Manager, Trelleborg Sealing Solutions, Streamwood, IL**

# Course descriptions

These descriptions summarize our main course offerings. All training plans may be customized to meet your specific requirements.



## Workplace Safety

The Occupational Safety and Health Administration (OSHA) requires industry-specific training for employees on safety and health hazards in the workplace. Evidence of mandated training is a critical aspect of OSHA compliance in the manufacturing sector.

JARC delivers OSHA-compliant training in a number of formats – the 10- and 30-Hour programs for General Industry, as well as stand-alone training on specific topics. Safety training may be delivered on-site, during any shift, and in any language that you require.

The following course outlines may be an effective starting point for safety training at your company.

### OSHA 10-Hour for General Industry

The 10-hour course surveys health and safety hazards common to manufacturing, as well as employer and employee rights and responsibilities in maintaining a safe working environment. The content aligns with OSHA standards 29 CFR 1910 and includes mandatory and elective topics. Mandatory topics require approximately 7 hours of the program. Employers may choose among the elective topics for the remaining 3 hours with a minimum of 30 minutes of training on these topics.

#### Mandatory topics include:

- Introduction to OSHA
- Personal Protective Equipment (PPE)
- Hazardous Communication (HAZCOM)
- Walking and Working Surfaces/ Fall Protection
- Exit Routes, Emergency Action Plans (EAPs), Fire Prevention Plans, and Fire Protection
- Electrical

#### Elective topics include:

- Hazardous Materials (HAZMAT)
- Material Handling
- Industrial Hygiene
- Blood-borne Pathogens
- Safety and Health Programs
- Respirator Use
- Ergonomics
- Fall Protection

**Hours: 10 Hours**

**Prerequisite: None**

WE BELIEVE

**The key to long-term, substantive change for people is a focus on careers.**

### OSHA 30-Hour for General Industry

The 30-hour general industry course is intended for team members who play a leadership role in crafting or enforcing safety policy in your company. This training is especially relevant for plant supervisors as well as any employees who participate on safety teams. The 30-Hour course emphasizes hazard identification, avoidance, control, prevention and record-keeping. This training is also a recommended starting point for companies that would like to pursue an OSHA Train the Trainer in order to keep safety training in-house. Note that the OSHA 30-Hour does not by itself qualify as a Train the Trainer.

#### Mandatory topics:

- Introduction to OSHA
- Managing Safety and Health
- Walking and Working Surfaces, Fall Protection
- Exit Routes, Emergency Action Plans (EAPs), Fire Prevention Plans, and Fire Protection
- Personal Protective Equipment (PPE)
- Hazardous Communication (HAZCOM)
- Materials Handling

#### Elective topics:

- Hazardous Materials (HAZMAT)
- Lock-Out/Tag-Out (LOTO)
- Machine Safeguarding
- Welding, Cutting and Brazing
- Fall Protection
- Safety and Health Programs
- Powered Industrial Vehicles
- Optional Topics

**Hours: 30 Hours**

**Prerequisite: None**



### Workplace Safety — Various Topics

JARC can provide shorter break-out sessions focused on individual safety topics, ranging from OSHA-mandated topics to your company's safety policies and priorities. These modules are typically 1-2 hours in length per cohort.

**Hours: 1-2 Hours**

**Prerequisite: None**

### Forklift Safety and Operation (OSHA 29 CFR 1910.178)

#### OSHA 3-Year Certificate

Federal law requires any employee operating forklifts or other mechanized vehicles to be trained and certified on that equipment. This class meets the requirements of 29 CFR 1910.178 mandated by OSHA.

Hands-on training includes safe driving and operation of gas- and electric-powered lift equipment, including both sit-down and stand-up forklift trucks. It can be customized to include other powered lift equipment (hand-pallets, overhead cranes, aerial lifts, etc.).

Recommended training for first-time certification is 10-12 hours, allowing time for these core activities:

- Classroom training includes presentations and discussion, videos and a workbook that prepares trainees for the written exam. Classroom training can be delivered in English and Spanish.
- Hands-on training includes driving and steering (sit-down and / or stand-up trucks), handling inclines and close spaces, retrieving and stacking pallets, chocking and pedestrian safety. Routine maintenance skills include changing propane tanks and using battery chargers.
- 3-Year Certificate Exam includes the Written and Hands-On portion. Back of Certification Card itemizes equipment that team members are approved to operate.
- Specialized training is available for a wide range of aerial lift equipment including four-way, double forks, slip sheet, and scissor-lift.

**Hours: 12 Hours**

**Prerequisite: None**

### Forklift Safety and Operation (OSHA 29 CFR 1910.178)

#### Re-Certification

JARC can provide streamlined training to re-certify Forklift Operators at or before the expiration of the three-year certificate.

**Hours: 2-4 Hours**

**Prerequisite: Forklift Safety and Operation (3-Year Certificate)**

### Forklift Safety and Operation (OSHA 29 CFR 1910.178)

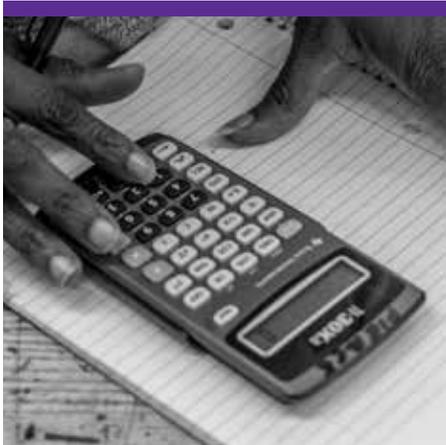
#### Train the Trainer

JARC is OSHA-approved (29 CFR 1910) to help your company design and implement a customized Train-the-Trainer program, including the tool box and initial Train-the-Trainer for your team.

**Hours: 12 Hours**

**Prerequisite: Forklift Safety and Operation (3-Year Certificate)**





## Basic Skills

Entry level and lower-skilled machine operators often lack the baseline skills needed to reliably execute their job functions in a modern manufacturing environment, much less thrive and grow within your company.

### Manufacturing Skills 1 (Math, Print reading, Metrology)

This class integrates the basic math, print reading and metrology skills that machine operators and production workers need in order to execute their frontline quality assurance functions in a lean manufacturing environment.

The integrated curriculum means a contextualized or “hands-on” approach to math instruction that is far more effective with ABE (Adult Basic Education) level learners who typically struggle with traditional basic math instruction.

This class builds core competencies and is also the prerequisite for more advanced technical classes. The curriculum can be customized to add or subtract basic skills topics.

#### Math topics include:

- Fractions – Basic Operations and Arithmetic
- Decimals – Basic Operations and Arithmetic
- Calculator proficiency and applied math skills (commonly used shop formulas, material handling problems, etc.)

#### Print Reading includes:

- Orthographic projection
- 3, 2 and 1-view drawings
- Types of lines, notes and symbols
- Inferring tolerances from given dimensions

#### Metrology includes:

- Steel scale
- 0-6” Dial calipers
- 0-1” Micrometers

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: None**

WE BELIEVE

Everyone who works has the right to a living wage; and that training leads to better paying jobs.

### **Manufacturing Skills 2 (Math, Print reading, Metrology)**

This class is for team members who have completed or tested out of Manufacturing Skills 1. It begins with a quick review and then builds toward intermediate and advanced level math, print reading and metrology skills.

(Note that there is some overlap between MS2 and Fundamentals of Quality Control, see below, as well as their target audiences. The content of MS2 is more biased toward intermediate math while the content of QC leans toward intermediate metrology and quality assurance concepts.)

#### **Math topics include:**

- Review of Basic Math, including conversions
- Metric Math, including conversions
- Algebra Crash Course – Working with basic equations; Set Up and solve for unknown values
- Trigonometry Crash Course – Right Triangle Trig functions (sin, cos, tan) and applications (tapers, bolt-hole circle patterns, Z drill depth, thread cutting, etc.)
- Applied Math – Use common shop formulas (spindle speed (RPM), feed rate, tap drill size, bend allowances, and other formulas or applications from the Machinist's Handbook)
- Calculator proficiency and higher level math skills

#### **Print Reading includes:**

- Review of Print Reading fundamentals
- Intermediate Print Reading (Rotated Views, Section Views, Assembly Prints)

#### **Metrology includes:**

- Review of Metrology Fundamentals
- Intermediate Metrology (Height Gage, Dial Indicator, Pin Gages)
- SPC Crash Course (Calculate and Plot Average and Range)

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

### **Metalworking Skills Assessment**

This is a standardized diagnostic test which JARC developed in collaboration with the Precision Metalforming Association (PMA) and a host of industry partners. It is legally validated and available in English and Spanish.

This test allows you to evaluate your workforce in Basic Math, Applied Math, Print Reading, Metrology and Safety/Machine Technology. This test is often used to test in or test out of Manufacturing Skills 1 (a prerequisite for more advanced training).

For a low cost, JARC can administer the test and develop a targeted, plant-wide strategy to train your shop floor personnel. A testing session runs about an hour; a complete diagnostic report with training recommendations can follow within 24-48 hours.

### Supervisory Training

This training is designed for the new supervisor and front-line leader, but it can be adapted for any level of leadership and customized to meet your specific concerns. It engages emerging leaders who know your team and your company but who may lack formal business training and leadership skills. It can also be an effective way to communicate your leadership culture and practices to external hires who have joined your management team.

Understanding EEOC and other HR laws can help prevent costly lawsuits and avoid employee relations issues. A proactive approach to training on issues of potential liability can provide some “safety rails” for your new and emerging leaders.

#### Topics may include:

- Delegating responsibility and motivating employees
- Performance management
- Coaching and positive reinforcement
- Conflict resolution
- Sexual harassment and workplace diversity
- Designing/conducting performance appraisals
- Staff development
- Progressive discipline
- Supervision and labor law

Company documents, policies and procedures are incorporated into practical activities and role-playing exercises.

**Hours: Plan about 2 hours per topic for a full-length course or stand-alone modules.**

**Prerequisite: None**

### Computer Skills

Computer literacy is required for most job functions and career paths. From CNC to ERP, every aspect of the manufacturing process involves computer technology, yet entry-level and incumbent workers may lack the baseline computer skills needed to execute their basic functions, let alone skill up and grow with the company.

JARC offers a range of training modules to build basic computer competencies, as well as diagnostic tools to help you find the right starting point for your team. Training can be delivered at JARC or on-site using laptops.

#### Training modules include:

- Intro to Personal Computers
- Intro to Microsoft Office Suite (Outlook, Word, Excel, PowerPoint)
- MOS Topics
- Intro to Enterprise Resource Planning (ERP) Systems - Customized

**Hours: Intro to PC (16 hrs); Intro to MOS (32-40 hrs); stand-alone modules (8 hrs); ERP (8-32 hrs)**

**Prerequisite: Take or test out of Intro to PC is recommended prerequisite for MOS training**





## Quality Assurance & Quality Control

New approaches to quality assurance require machine operators and production staff to assume more responsibility in a culture of continuous improvement.

### Fundamentals of Quality Control

This class begins with a review of the basic print reading and metrology skills covered in Metalworking Skills I. We do this before moving on to more advanced print reading and a much wider survey of precision measuring instruments and techniques through practical exercises.

Design of this class requires close coordination with your QA leadership to develop practical curricula based on your parts, prints and quality procedures. The class is highly customized and can include modules on these and other topics:

- Review of Print Reading fundamentals
- Intermediate Print Reading (Rotated Views, Section Views, Assembly Prints)
- Review of Metrology Fundamentals
- Intermediate Metrology (Height Gage, Dial Indicator, Pin Gages, Functional Gages)
- Metric Math and Measurement
- Welding Symbols
- SPC Crash Course (Calculate and Plot Average and Range)
- GD&T Crash Course (Basic Symbols, Datum and Inspection)
- Comparator
- Coordinate Measuring Machine

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

WE BELIEVE

**Business and employee success are inextricably tied; we work to bridge economic activity and people.**



### Statistical Process Control (SPC) 1 & 2

Originating in the automotive supply chain, Statistical Process Control (SPC) has become a standard business tool that uses data to monitor and control the stability of a manufacturing process.

SPC 1 presents Statistical Process Control to machine operators and frontline staff. Using histograms, team members discuss what the different patterns tell the customer about process stability and its impact on price. From here team members learn how to calculate and plot average and range and to generate and analyze histograms on their own.

SPC 2 is intended for those engaged in process improvement, especially engineering, sales, customer service, and QA personnel. Trainees learn how to measure process capability and how SPC data can be used for improving manufacturing processes. They will learn about principles and calculations for attribute charting, Six Sigma and PPM.

**Hours: Typically 12 Hours per module (2 hours per session, 2 sessions per week for 3 weeks)**

**Prerequisite for SPC 1: Manufacturing Skills 1 or Equivalent**

**Prerequisite for SPC 2: SPC 1 or Equivalent**

### Geometric Dimensioning and Tolerancing (GD&T) 1 & 2

Geometric Dimensioning and Tolerancing (GD&T) is used throughout the defense industries and the automotive supply chain. It is a critical method for communicating customer requirements and for solving assembly problems.

GD&T can seem abstract, but JARC takes a practical, hands-on approach by focusing on the company's applications. The curricula incorporates company parts, prints and inspection processes to illustrate GD&T principles, controls and callouts.

GD&T 1 focuses on interpreting and measuring common GD&T callouts. The class introduces terms, symbols, and nomenclature, including feature control frames, primary and secondary datum, types of tolerance, geometric characteristics and symbols. Classroom theory is punctuated with hands-on work at the surface plate.

GD&T 2 goes deeper into position tolerancing, profile controls and measuring techniques for verification of tolerances, including paper gages. This level of training is most suitable for engineers, tool room machinists and quality assurance personnel, and is valuable for anyone who has to discuss print requirements with customers.

**Hours: Typically 16 Hours per module (2 hours per session, 2 sessions per week for 4 weeks)**

**Prerequisite for GD&T 1: Manufacturing Skills 1 or Equivalent**

**Prerequisite for GD&T 2: GD&T 1 or Equivalent**



## Manufacturing Skills

New manufacturing processes and technologies have revolutionized American manufacturing, creating middle-skills jobs and career paths. As employers invest in new equipment, they need to skill up their existing workforce to learn and operate the new technologies.

JARC offers customized training classes in CNC machining, welding, stamping and press brake. JARC's approach is hands-on and practical. All of the classes are taught by qualified industry professionals. Classes may be taught at JARC or on-site at your facility using your equipment and processes.

### CNC Milling – Machine Set Up, Operation and Safety

This class provides a hands-on survey of operator and set-up functions for CNC milling machines, stressing safety and best practices.

#### Operator Functions include:

- Machine safety
- Routine maintenance, including oil and coolant levels
- Home machine – XYZ Zero
- Operate tool magazine
- Change insert, tool, tool assembly
- Touch off tool
- Make offset (D or H)
- Select Automatic mode
- Override Speed, Feed and Rapid
- Activate Option Stop, Program Stop and Emergency Stop
- Production cell and auxiliary equipment, including 5S
- Pallet changer and flexible manufacturing system safety and operation
- Secondary operations, including de-burring

#### Set-Up Functions include:

- Download / install programs
- Remove / install vice or fixture
- Install, touch off tool
- Establish PRZ
- Verify program
- 6 elements for Safe Prove Out (Speed, Feed, Rapid, Single Step, Option Stop, Feed Hold)
- Inspect, troubleshoot First Piece, including offsets vs. edits
- Set up auxiliary equipment
- Overview of quality procedures

**Hours: Typically 16 Hours (2 hours per session, 2 sessions per week for 4 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**



### CNC Milling – G-Code Programming

This class provides a solid foundation in G-Code programming for CNC Milling operations. Trainees use a computer simulator software to write programs for part projects that introduce and reinforce the XYZ Cartesian Coordinate system for milling, G-Codes, M-Codes, letter addresses and other concepts ranging from cutter compensation to drilling cycles and other subroutines.

Following the mid-term project, trainees are challenged to program the part profile and other features on the certification piece of NIMS CNC Milling Level 1. These and other part projects involve math and theory, including right triangle trig functions (taper endpoints, bolt hole circle patterns) and a number of common machine shop formulas and calculations (speeds, feeds, Z drill depth).

The mid-term and final projects are similarly designed to incorporate programming fundamentals, math and theory covered in the class.

#### Main topics include:

- Understanding X,Y,Z Coordinate System for CNC milling
- G-Codes, M-Codes and Letter Addresses
- Cutter compensation
- Drilling and other common subroutines
- Relevant math and theory

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisites: Manufacturing Skills 1 or Equivalent**

**Recommended: CNC Milling – Set Up, Operator and Safety or Equivalent**

### CNC Turning – Machine Set Up, Operation and Safety

This class provides a hands-on survey of operator and set-up functions for CNC milling machines, stressing safety and best practices.

#### Operator Functions include:

- Machine safety
- Routine maintenance, including oil and coolant levels
- Home machine – XZ Zero
- Operate tool magazine
- Change insert, tool, tool assembly
- Touch off tool
- Make offset (D or H)
- Select Automatic mode
- Override Speed, Feed and Rapid
- Activate Option Stop, Program Stop and Emergency Stop
- Production cell and auxiliary equipment, including 5S
- Bar Feeder safety and operation
- Secondary operations, including de-burring

#### Set-Up Functions include:

- Download / install programs
- Remove / install vice or fixture
- Install, touch off tool
- Establish PRZ
- Verify program
- 6 elements for Safe Prove Out (Speed, Feed, Rapid, Single Step, Option Stop, Feed Hold)
- Inspect, troubleshoot First Piece, including offsets vs. edits
- Set up auxiliary equipment
- Overview of quality procedures

**Hours: Typically 16 Hours (2 hours per session, 2 sessions per week for 4 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

### CNC Turning – G-Code Programming

This class provides a solid foundation in G-Code programming for CNC Turning operations. Trainees use a computer simulator software to write programs for part projects that introduce and reinforce the XZ Cartesian Coordinate system for turning, G-Codes, M-Codes, letter addresses and other concepts. These range from Tool Nose Radius (TNR) compensation to rough and finish turning cycles and other subroutines.

Following the mid-term project, trainees are challenged to program the part profile and other features on the certification piece of NIMS CNC Turning Level 1. These and other part projects also involve math and theory, including right triangle trig functions (taper endpoints) and a number of common machine shop formulas and calculations (speeds, feeds, Z drill depth).

The mid-term and final projects are similarly designed to incorporate programming fundamentals, math and theory covered in the class.

#### Main topics include:

- Understanding X, Z Coordinate System for Turning
- G-Codes, M-Codes and Letter Addresses
- Tool Nose Radius (TNR) compensation
- Rough and Finish Turning Cycles and other common subroutines
- Relevant math and theory

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisites: Manufacturing Skills 1 or Equivalent**

**Recommended: CNC Turning – Set Up, Operator and Safety or Equivalent**



### CAD/CAM

This class presents the fundamentals of computer aided design (CAD) and computer aided machining (CAM) using Gibbs CAM 12 packages for CNC milling and turning processes. Trainees learn how to draft a part; plot locations, angles and other features; create tooling; generate G-Codes and post process; generate tool paths and layers, including adaptive milling; execute a variety of simulations for tool paths.

Trainees use a Gibbs CAM to generate a part design and a post process to machine the part on a CNC using G-Codes and M-Codes. Advanced projects can include multi-part machining, 5-Axis machining and other skills. The Gibbs-CAM technology used in this class is similar to Master CAM and other CAM applications that are widely used.

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisites: Manufacturing Skills 1 or Equivalent;**

**Recommended: G-Code Programming (CNC Mill / CNC Turn) or Equivalent**

### Welding – Shielded Metal Arc Welding (SMAW or ‘Stick’)

This class provides hands-on training in the fundamentals of Shielded Metal Arc Welding (SMAW or ‘Stick’). The class begins with a thorough overview of welding safety for SMAW applications and then moves to Processes and Principles of SMAW, including electrical currents and polarities, welding machine operations, electrode classifications, and welding positions.

With this foundation, the balance of the class is hands-on. Trainees learn how to execute all basic welds and joints in a variety of positions. Trainees learn to how to set up, operate and adjust Alternating and Direct Constant Current welding machines. Trainees learn to select and use the correct electrode using the AWS electrode classification system.

The class is taught by AWS certified instructors and may be customized to include relevant AWS credentials (additional testing fees apply).

#### Topics include:

- Welding Safety
- SMAW Processes and Principles
- SMAW Equipment and Supplies (Machines and Electrodes)
- Joints, Welds and Positions
- Welding Prints and Symbols

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

### Welding – Gas Metal Arc Welding (GMAW or ‘MIG’)

This class provides hands-on training in the fundamentals of Gas Metal Arc Welding (GMAW or ‘MIG’). The class begins with a thorough overview of welding safety for GMAW applications and then moves to Processes and Principles of GMAW, including electrical currents and polarities, welding machines operations, electrode classifications (wire), inert shielding gas and welding positions. The class includes a thorough overview of GMAW equipment and supplies. For example, trainees learn how to dismantle and reassemble the entire welding unit in a two-hour exercise.

With this foundation, the balance of the class is spent on welding. Trainees learn how to execute all basic welds and joints in variety of positions. Trainees learn to how to set up, operate and adjust welding machines and wire feed to produce an optimal weld. Trainees learn how to identify and troubleshoot quality defects, including penetration, burn-through and porosity.

The class is taught by AWS certified instructors and may be customized to include relevant AWS credentials (additional testing fees apply).

#### Topics include:

- Welding Safety
- GMAW Processes and Principles
- GMAW Equipment and Supplies
- Joints, Welds and Positions
- Fit Up and Fixturing
- Welding Prints and Symbols

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

WE BELIEVE

In supporting the regional manufacturing base because it is a source of careers and living wages.

### Welding – Gas Tungsten Arc Welding (GTAW or ‘TIG’)

This class provides hands-on training in the fundamentals of Gas Tungsten Arc Welding (GTAW or ‘TIG’). The class begins with a thorough overview of welding safety for TIG applications and then moves to Processes and Principles of GTAW, including electrical currents and polarities, welding machines operations, electrode classifications (tungsten), shielding gases (argon and helium), filler metal and relevant metallurgy. The class includes a thorough overview of GTAW equipment and supplies. For example, trainees learn how to dismantle and reassemble the entire welding unit in a two-hour exercise.

With this foundation, the balance of the class is spent on welding. Trainees learn how to execute a variety of basic welds and joints using GTAW technology and processes.

The class is taught by AWS certified instructors and may be customized to include relevant AWS credentials (additional testing fees apply).

#### Topics include:

- Welding Safety
- GTAW Processes and Principles
- GTAW Equipment and Supplies
- Joints, Welds and Positions
- Welding Prints and Symbols

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**



### Welding – Program and Operate Robotic Welder

This class provides hand-on training in the use of Robotic Welding Technology. Trainees learn how to program, set up and operate a robot welding arm using a FANUC interface. The class begins with a thorough review of all relevant safety. Operator training includes power up and home robot, teach pendant and operator panel, joint jogging and coordinate jogging, and other machine functions. Set up and programming functions include setting up the welding system, tool frame and safe axis limits. Programming lessons are aligned with the FANUC Robotics Operation and Programming Guide.

Trainees should have prior knowledge of basic welding processes. Prior knowledge of XYZ Cartesian Coordinate System is also helpful.

#### Topics include:

- Welding and robot safety
- Operate robot control panel and components
- Programming and set-up jobs

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**



## Welding – Other Topics, Specialized Training and Certifications

JARC has several full-time welding instructors, including an AWS Certified Welding Educator (CWIE) and member of the AWS National Advisory group. JARC's Welding faculty has the capacity and expertise to design and execute a wide variety of specialized training and certification activities, including industry-specific AWS qualifications and standards.

### Other topics include:

- Flux-Cored Arc Welding (FCAW)
- Oxy and Acetylene Torch Cutting
- Specialized AWS Certifications
- Welding Symbols
- Welding Inspection

## Punch Press Set-Up, Operation and Safety

This course offers intensive hands-on training in the fundamentals of safe, efficient die-setting techniques for straight-side and open back inclinable punch presses.

### Topics include:

- Punch press safety and safeguarding
- Types of presses and dies
- Components of presses and dies
- Press line (de-reeler, straightener, feed)
- Machine modes – inch, jog, continuous
- Die removal (clean and store)
- Centering plates and dies
- Establish shut height
- Adjust ram
- Adjust gib tension and balance
- Correct clamping techniques
- Inspect and troubleshoot first piece

Relevant print reading and inspection competencies are introduced and reinforced with each project.

Safety and housekeeping are stressed throughout the course.

Pressroom training may be customized to include principles of lean pressroom, including Quick Die Change (Single Minute Exchange of Die or "SMED") and an introduction to 5S (see also "Lean Manufacturing," page 18).

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

## Press Brake Set-Up, Operation and Safety

This course offers hands-on training in all aspects of press brake set-up, operation and safety.

### Topics include:

- Press Brake safety; including part holding, safeguarding and sensor technology
- Types of presses and dies
- Components of presses and dies
- Select and measure die and punch
- Material properties
- Types of forms and bends
- Calculate bend allowance
- Bend clearance and bend sequence
- Machine modes
- Die change
- Establish shut height
- Inspect, troubleshoot first piece

Relevant print reading and inspection competencies are introduced and reinforced with each project.

Safety and housekeeping are stressed throughout the course.

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

## Press Brake – CNC Programming

This class introduces CNC programming and CAD/CAM technology for press brake applications, including bend simulation software.

### Topics include:

- Install, edit program using interface
- Update tool and punch library
- Create and edit part programs using interface
- Generate part programs using automatic bend sequence calculation
- Simulate bending operation
- Verify sequence and positions
- View and edit parts in 2D and 3D Views
- Import, export files
- Unfolder module unfolds 3D solid model to flat pattern with bend lines

**Hours: Typically 32 Hours (2 hours per session, 2 sessions per week for 8 weeks)**

**Prerequisite: Manufacturing Skills 1 or Equivalent**

## Machine Tool Set Up, Operation and Safety

JARC provides hands-on training modules for most conventional machine tools, including:

- Band Saws (8 hrs)
- Drill Press (12 hrs)
- Vertical Milling Machine (32 hrs)
- Engine Lathe (32 hrs)

**Hours: Modules range in length**

**Prerequisite: Manufacturing Skills 1 or Equivalent**



## Lean Manufacturing

Lean Manufacturing principles are derived from the Toyota production system that emerged after WWII. Lean Manufacturing achieves efficiency and profitability through continuous process improvement (“kaizen”) and elimination of waste. In a nutshell, manufacturing processes are streamlined to include processes that add value and eliminate those that do not.

JARC offers customized training to facilitate your lean journey. Our approach is hands-on and project-based. The training can be customized to include different groupings within your organization as we help you unpack and implement lean approaches that will work for you.

### 5S

Begin your lean journey with a 5S – reorganizing the physical work space for efficiency and effectiveness. 5S is a foundation principle of Lean and roughly translates to include: sort, set in order, shine, standardize and sustain.

5S improves work flows and set up times by eliminating inefficient use of space and physical bottle necks.

The training will focus on an actual project that is management-driven and employee-supported. At “sustain” training will prepare internal auditors (and score cards); after training JARC instructors will return to simulate an audit and debrief with internal auditors, leadership and other stakeholders.

**Hours: TBD**

**Prerequisite: None**



## 8 Ways of Waste

8 Ways of Waste promotes efficiency by targeting aspects that drain value from the manufacturing process, including defects, waiting, overproduction, not utilizing talent, transportation, inventory excess, motion waste, and excess processing.

The most effective approach to lean training is hands on. Choose a problem department or process to tackle in this class.

**Hours: 8**

**Prerequisite: None**

## Root Cause Analysis and Failure Mode

Eliminating defects is key to boosting efficiency, competitiveness and profitability. This training begins with 8D / Failure Mode – how to contain and control defects once they are discovered. From here training goes to root cause analysis, using techniques such as the 5 Why's, Fishbone Diagram and Pareto Chart to identify, isolate and eliminate the source of non-conformance.

The use of actual case studies will make the training more engaging and meaningful for the team.

**Hours: 8**

**Prerequisite: None**

**Recommended: SPC 1 and SPC 2 or Equivalent**



## Value Stream Mapping

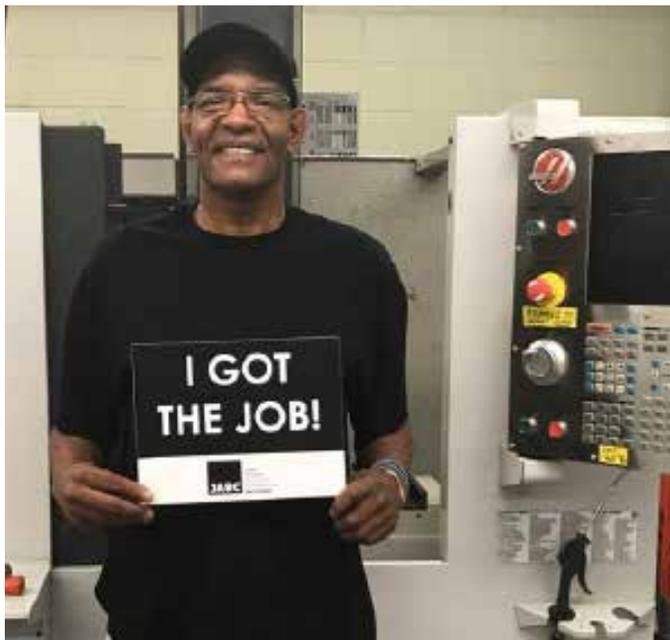
Value Stream Mapping is used to document, analyze and improve the flow of materials and data required to produce a product or service for a customer. Value stream mapping facilitates a higher level discussion of the flow than typically occurs in a department meeting.

As a lean principle, mapping is used to identify processes that add value and target processes that do not.

Value stream mapping eliminates waste in the form of waiting, overproduction and unnecessary or duplicated effort.

Key concepts (and outcomes) of value stream mapping will include:

- Super Market / FIFO Lanes
- Kanban
- Levelized Production
- Just In Time



*“We hired our first JARC graduate in 2017, and have about six JARC graduates employed now. It’s a nice alternative to using temp firms to fill our vacancies. The skill sets of JARC graduates are consistent. They know the basic principles of machining very well. This allows us to quickly move applicants into our areas of need and not waste resources and time confirming they understand concepts that they should already know.”*

**—Christopher Jadra, Vice President of Technical Operations and Engineering, Raloid Corporation, Reisterstown, MD**

# Need skilled entry-level workers?

You are not alone. A 2012 study by Deloitte and the Manufacturing Institute found 600,000 unfilled jobs in the manufacturing sector. It is one thing to create jobs and another thing to fill them.

A 2017 update to the Deloitte/Manufacturing Institute study found that the skills gaps in the manufacturing sector continues to widen as the economy improves. Analysts conclude that the skills gap will hit 2.5 million unfilled jobs by the year 2025.

**JARC's Careers in Manufacturing Programs** can be your pipeline for qualified, entry-level hires. Programs include:

- **CNC Machinist** (Chicago and Baltimore) – 20 Weeks, 500 hours.
- **GMAW Welder** (Chicago) – 14 Weeks, 350 hours
- **SMAW Welder** (Baltimore) – 14 Weeks, 350 hours
- **Press Brake Set Up Operator** (Chicago) – 12 Weeks, 300 hours

## The JARC Advantage

JARC's job training programs are hands-on, industry-relevant and employer-driven. Best practice strategies include:

- **Open Entry / Open Exit** – Unlike a semester system, JARC has trainees ready for job placement anytime throughout the year.
- **Simulated Work Environment** – Our program design and curricula are hands-on and project-based. Our training center simulates the workplace with a time clock and high standards for performance, attendance and accountability.
- **Industry Credentials** – Trainees attain industry credentials through the National Institute for Metalworking Working Skills (NIMS) or the American Welding Society (AWS). Trainees in all programs attain OSHA 10-Hour for General Industry.

Trainees receive a comprehensive array of supportive services while they are in the training programs, including public benefits screening, financial coaching and employment services. These bundled services serve to lift up the whole household. JARC graduates enter your firm with their personal lives in order and ready to work.

*"In the past several years we have hired over 20 JARC graduates. JARC does a good job of screening their trainees so that our candidates are a good fit. One thing they do better than most is to fully prepare the students for the work environment. Plus JARC offers financial education, public benefits screening and employment coaching."*

**—Carl Ollerer, Human Resources and Health, Safety Environmental Manager, Trelleborg Sealing Solutions, Streamwood, IL**



***Building success that lasts  
in work,  
life and  
community.***

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