



# PRE-APPRENTICESHIP PROGRAMS

**Pre-apprenticeship programs** help individuals meet the entry requirements for Registered Apprenticeship Programs (RAPs) or to prepare for direct entry into a manufacturing job. Combining work-based, hands-on learning with instructional-based hybrid learning, pre-apprenticeship programs provide the knowledge and skills employers need and place an individual on a career pathway.

**TOOLING U-SME's Accelerated Advanced Manufacturing Pre-Apprenticeship Program** allows you to train students and incumbent workers in the basic foundational skills for advanced manufacturing and help them choose a career pathway of specialization.

- Assist dislocated workers
- Build a pipeline of skilled workers
- Advance and support veterans
- Educate and energize at-risk youth
- Upskill incumbent workforce

Tooling U-SME partners with community organizations, educational institutions and employers to offer a combined learning approach. Individuals build skills from working hands-on in an educational setting or manufacturing facility, and acquire knowledge through Tooling U-SME's industry-leading online classes. Through blended learning, individuals learn concepts and theories while gaining real-world experience.

## MACHINING

Prepares individuals for careers as Precision Machinists and CNC Operators/Programmers

## INDUSTRIAL MAINTENANCE

Prepares individuals for careers in Mechatronics, Automation and Robotics

## WELDING

Prepares individuals for careers in ARC, MIG, TIG, Fabrication and more

## MANUFACTURING FUNDAMENTALS

Core foundational skills necessary for advanced manufacturing career pathways

# PRE-APPRENTICESHIP PROGRAMS

## MANUFACTURING 101 BOOT CAMP – MANUFACTURING FUNDAMENTALS Approximately 25 hours

This program is designed to be completed in 90-120 days. The online curriculum can be accessed 24/7 from any computer with Internet access. This program will also prepare students for: Industrial Maintenance 102; Machining 103; Welding 104.

Basic Measurement	Intro to Abrasives	Intro to Mechanical Systems	Intro to Mechanical Properties	Math Fractions & Decimals
Basics of Manufacturing Costs	Intro to Additive Manufacturing	Intro to OSHA	Intro to Metals	Quality Overview
Basics of Tolerance	Intro to Assembly	Intro to Pneumatic Components	Intro to Physical Properties	Troubleshooting
Blueprint Reading	Intro to Fluid Systems	Intro to Robotics	Intro to Welding	Units of Measurements
Essentials of Communication	Intro to Hydraulic Components	Intro to CNC Machines	Math Fundamentals	

## MANUFACTURING 102 – WELDING BASICS Approximately 25 additional hours

This program was designed to follow Manufacturing 101 Boot Camp. Welders are responsible for joining metal parts by melting the joint with heat generated from an electrical current. This position demands an understanding of electrical conductivity and circuits, arc welding equipment and processes, properties of metals and print reading. Arc welders often work indoors and outdoors in a variety of settings and must know and adhere to strict safety practices.

Advanced GMAW Applications	Fire Safety and Prevention	Intro to GMAW	Overview of Soldering	Thermal Cutting Overview
Classification of Steel	Geometry Fundamentals for Welding	Intro to GTAW	Overview of Weld Defects	Welding Ferrous Metals
Electrical Power for Arc Welding	GMAW Applications	Intro to SMAW	Overview of Weld Types	Welding Fumes and Gases Safety
Electrical Safety for Welding	GTAW Applications	Intro to Welding	Oxyfuel Cutting Applications	Welding Nonferrous Metals
Electrical Units	Intro to Automation	Intro to Welding Processes	Plasma Cutting	Welding Safety Essentials
Fabrication Process	Intro to Circuits	Material Tests for Welding	PPE for Welding	Welding Symbols and Codes
FCAW Applications	Intro to FCAW	Math Fundamentals for Welding	SMAW Applications	

## MANUFACTURING 103 – INDUSTRIAL MAINTENANCE BASICS Approximately 24 additional hours - Follows Boot Camp 101

The general maintenance and repair workforce is responsible for maintaining and fixing a wide range of building systems and mechanical equipment. This position requires a broad knowledge of electrical systems and wiring, fluid systems and plumbing, mechanical drives and machines, hand tools and fasteners, and print reading. General maintenance and repair workforces also benefit from learning preventative maintenance and similar approaches.

AC Motor Application	Electrical Units	Intro to PLCs	Power Transmission Components	Safety for Mechanical Work
Arc Welding Process	Fittings for Fluid Systems	Lubricant Fundamentals	Preventive Maintenance for Fluid Systems	Solenoids
Bearing Applications	Forces of Machines	Mechanical Power Variables	Safety for Electrical Work	Spring Applications
Belt Drive Applications	Intro to Electric Motors	Mechanics of CNC	Safety for Hydraulics & Pneumatics	Symbols & Diagrams for Motors
DC Motor Applications	Intro to Mechanical Systems	NEC (R) Overview		The Forces of Fluid Power

## MANUFACTURING 104 – MACHINING BASICS Approximately 40 additional hours per month - Follows Boot Camp 101

Machinists and machine setters are skilled machine tool operators capable of working with both lathes and mills, and both manual and CNC machines. This position demands an understanding of cutting tool theory, CNC coordinate system, basic G code programming, manual machining, part inspection, and workpiece material properties. General machinists and machine setters also are expected to have excellent print reading and math skills and will likely perform first-time setups for new jobs.

Algebra Fundamentals	Calibration Fundamentals	Cutting Processes	Intro to Metals	Safety for Metal Cutting
Basic Cutting Theory	Chucks, Collets and Vises	Cutting Tool Materials	Intro to Physical Properties	Supporting & Locating Principles
Basic Measurement	Clamping Basics	Engine Lathe Operation	Locating Devices	Surface Grinder Operation
Basics of G Code Programming	CNC Offsets	Intro to Workholding	Manual Mill Operation	Surface Texture & Inspection
Basics of the CNC Lathe	Control Panel Functions for CNC Lathe	Intro to CAD & CAM for Machining	Metal Cutting Fluid Safety	Trigonometry: Sine Bar Applications
Basics of the CNC Mill	Control Panel Functions for the CNC Mill	Intro to CNC Machines	Metal Manufacturing	Trigonometry: Sine Cosine Applications
Basics of the Engine Lathe	Coordinates for the CNC Lathe	Intro to GD&T	Overview of Engine Lathe Setup	Trigonometry: The Pythagorean Theorem
Basics of the Manual Mill	Coordinates for the CNC Mill	Intro to Mechanical Properties	Overview of Machine Tools	
Benchwork & Layout Operations		Intro to Metal Cutting Fluids	Overview of Manual Mill Setup	