



# CLASS CATALOG

Online Classes • Instructor-Led Training  
Learning Services • Customization  
Certifications • Assessments





## Why Tooling U-SME?

More than 50% of Fortune 500® manufacturing companies choose Tooling U-SME. Why? We offer competency-based learning solutions focused on your performance outcomes. This catalog provides a detailed list of all our online course offerings, including over 500 classes in multiple functional areas—plus information on instructor-led training, certification programs, assessments, custom content, and books and videos. But we do so much more. We'll analyze needs, assess your current knowledge, and develop a program that fills the gaps. Then, we'll help you launch, track, and measure the results. From beginner to advanced, our classes will help you train your new and existing employees and build your next-generation workforce.

# CONTENTS

## ONLINE & INSTRUCTOR-LED CLASSES

### 8 Foundational

Includes: Safety, Applied Mathematics, Materials, Inspection, Lean, Quality

### 11 Machining

Includes: Abrasives; CNC: Fanuc, Haas, Mazak, Manual Machining; Metal Cutting; Workholding

### 13 Maintenance

Includes: Electrical, Mechanical, Hydraulics & Pneumatics, Rigging, Motor Controls, PLCs, Robotics

### 15 Welding

Includes: Welding Basics, Arc Welding, GMAW, SMAW, GTAW

### 16 Additive Manufacturing

Includes: Additive Basics, Materials, Design

### 16 Stamping/Forming/Fabricating

Includes: Press and Stamping Basics, Operations, Coiling, Guides, Dies

### 17 Composites Processing

Includes: Composites Basics, Molding, Inspection

### 17 Assembly/Final Stage Processes

Includes: Adhesives, Coatings, Fasteners, Soldering

### 18 Design & Engineering

Includes: Blueprint Reading, FMEA, GD&T, Root Cause Analysis

### 18 Leadership

Includes: Supervisor Essentials, Communication, Accounting

## TRAINING PRODUCTS & SERVICES

### 19 Instructor-Led Training

### 19 Knowledge Edge®

### 20 Learning Services

### 21 Customization

### 22 Certifications

### 23 Assessments

## We are your training partner. With credentials.

Over the last 85 years, we've worked with hundreds of thousands of individuals, companies, and educational institutions. Our courses are aligned to national credentials including Lean Certification, Certified Manufacturing Engineer, Certified Manufacturing Technologist, and Certified Additive Manufacturing, plus National

Institute for Metalworking Skills (NIMS), Manufacturing Skills Standards Council (MSSC), American Welding Society (AWS), and Siemens Mechatronics certifications. Our courses also may be mapped to individual or state curriculum requirements.



## How can we help you?

Find out how we can partner with you to develop a competency-based solution to fit your training needs and your budget. Contact us at [info@toolingu.com](mailto:info@toolingu.com) or call 866.706.8665.



### **Tooling U-SME's customized training makes it possible to:**

- Develop mission-critical skills
- Minimize the skills gap
- Expedite onboarding and define skills development
- Capture and standardize “tribal knowledge”
- Ensure operational excellence/world-class manufacturing
- Boost operational effectiveness and productivity
- Drive continuous improvement
- Improve quality and reduce scrap
- Leverage new technologies and drive innovation
- Cross train and increase workforce flexibility
- Reduce learning curve for new technologies
- Decrease risk and exposure
- Improve safety
- Drive compliance

# COMPETENCIES

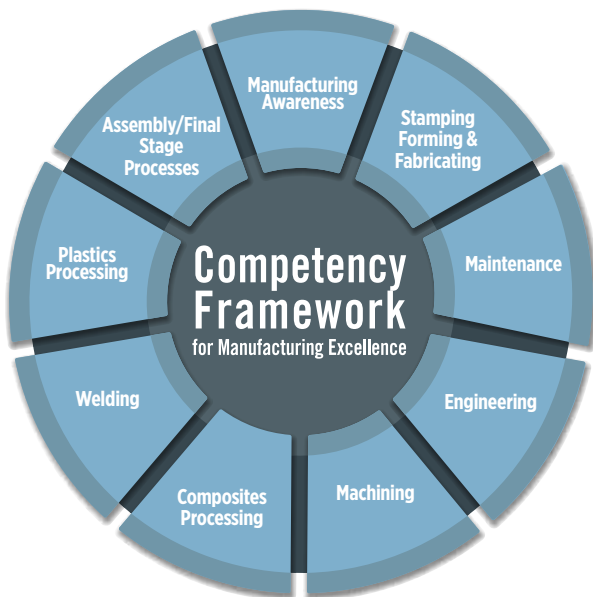
## Nine out of 10 manufacturers are struggling to find the skilled workers they need

To address this pressing challenge, Tooling U-SME brought together a cross-section of manufacturing experts to create a new industry resource: a Competency Framework for achieving manufacturing excellence.

The Competency Framework features a comprehensive series of competency models in nine manufacturing functional areas. It is made up of more than 60 job role competency models, which outline knowledge and skill objectives for production, technician, lead technician/technologist, and engineer-level job roles.

### The Competency Framework offers advantages that tie directly to business goals:

- Ensures enterprise-wide consistency, making a workforce more flexible and dynamic, and ultimately reducing labor costs
- Streamlines the training process and cuts costs by eliminating unnecessary and redundant training, allowing more training where needed
- Helps managers easily evaluate worker performance levels defined using specific behavioral indicators, reducing subjective assessment and increasing assessment accuracy
- Enhances employee satisfaction based on the rationality of the system
- Explains career pathways and defines what an average performer needs to become a superior performer



*Created by a cross-section of manufacturing experts, Tooling U-SME's Competency Framework is a comprehensive series of competency models in nine manufacturing functional areas.*



Designed to complement other competency models in the industry, the Competency Framework can be used “as is” or customized to individual work practices at your facility. Another benefit is that the knowledge objectives within the framework are mapped directly to Tooling U-SME’s extensive training resources. All this helps ensure your employees have the knowledge, skills, and abilities they need to be high performers.

# COMPETENCIES

# FOUNDATIONAL

## **Foundational: Instructor-Led Training**

Basic Electronics  
Blueprint Reading  
GD&T  
Industrial Safety / Low Voltage Safety  
Intro to Composites  
Train-the-Trainer: Accelerating Worker Performance  
Lean Fundamentals  
Lean Kaizen Workshop  
Lean Value Stream Mapping  
Quality Failure Modes and Effects Analysis (FMEA)  
Quality / Statistical Process Control (SPC)  
Quality Root Cause Analysis

## **Safety: Online Classes**

Intro to OSHA 101  
Ergonomics 102  
Personal Protective Equipment 111  
Noise Reduction and Hearing Conservation 121  
Respiratory Safety 131  
Machine Guarding 140  
Lockout/Tagout Procedures 141  
SDS and Hazard Communication 151  
Bloodborne Pathogens 161  
Walking and Working Surfaces 171  
Fire Safety and Prevention 181  
Flammable/Combustible Liquids 191  
Hand and Power Tool Safety 201  
Safety for Lifting Devices 211  
Powered Industrial Truck Safety 221  
Confined Spaces 231  
Environmental Safety Hazards 241  
Arc Flash Safety 251

## **Applied Mathematics: Online Classes**

**(Formerly Shop Essentials)**

Math Fundamentals 101  
Math: Fractions and Decimals 111  
Applied and Engineering Sciences 110  
Units of Measurement 112  
Basics of Tolerance 121  
Manufacturing Process Applications: Part I 124  
Manufacturing Process Applications: Part II 125

Blueprint Reading 131  
Algebra Fundamentals 141  
Geometry: Lines and Angles 151  
Geometry: Triangles 161  
Geometry: Circles and Polygons 171  
Shop Geometry Overview 170  
Trigonometry: The Pythagorean Theorem 201  
Trigonometry: Sine, Cosine, Tangent 211  
Trigonometry: Sine Bar Applications 221  
Shop Trig Overview 210  
Statistics 231  
Interpreting Blueprints 230  
Concepts of Calculus 310



### **Materials: Online Classes**

Introduction to Physical Properties 101  
Introduction to Mechanical Properties 111  
Introduction to Metals 121  
Introduction to Plastics 131  
Metal Manufacturing 140  
Classification of Steel 201  
Essentials of Heat Treatment of Steel 211  
Hardness Testing 221  
Ferrous Metals 231

Nonferrous Metals 241  
Thermoplastics 251  
Thermosets 261  
Ceramics 250  
Principles of Injection Molding 255  
Principles of Thermoforming 265  
Exotic Alloys 301



# FOUNDATIONAL (CONTINUED)

## **Inspection: Online Classes**

Basic Measurement 101  
Calibration Fundamentals 111  
Basics of Tolerance 121  
Blueprint Reading 131  
Hole Standards and Inspection 141  
Thread Standards and Inspection 151  
Surface Texture and Inspection 201  
Hardness Testing 221  
Measuring System Analysis 300  
Introduction to GD&T 301  
Introduction to GD&T 200 (1994)  
Major Rules of GD&T 311  
Interpreting GD&T 310 (1994)  
Inspecting a Prismatic Part 321  
Inspecting a Cylindrical Part 331  
Advanced Hole Inspection 341  
Inspecting with Optical Comparators 351  
Inspecting with CMMs 361  
Calibration and Documentation 371  
In-Line Inspection Applications 381

## **Lean: Online Classes**

Lean Manufacturing Overview 101  
Continuous Process Improvement: Managing Flow 124  
Continuous Process Improvement: Identifying and Eliminating Waste 125  
Developing a Lean Culture 135  
Total Productive Maintenance 141  
5S Overview 151  
Cell Design and Pull Systems 161  
Intro to Six Sigma 171  
Troubleshooting 181  
Conducting Kaizen Events 191  
SPC Overview 211  
Metrics for Lean 231  
Process Flow Charting 241  
Strategies for Setup Reduction 251  
Total Quality Management Overview 261  
Management Tools: Problem Solving 270  
Management Tools: Product and Process Design 275

Value Stream Mapping: The Present State 301  
Value Stream Mapping: The Future State 311  
Six Sigma Goals and Tools 310  
Maintaining a Consistent Lean Culture 330  
Transforming Lean Into Business Results 340  
Measuring Lean Systems 350

## **Lean: Instructor-Led Training**

Lean Fundamentals  
Kaizen Workshop  
Value Stream Mapping

## **Quality: Online Classes**

Quality Overview 100  
ISO 9000 Review 121  
ISO 9001: 2015 Review 122  
Approaches to Maintenance 131  
Process Design and Development 133  
Product Design and Development 134  
Production System Design and Development 136  
Equipment/Tool Design and Development 137  
Intro to Supply Chain Management 140  
Quality and Customer Service 175  
Conducting an Internal Audit 201  
IATF 16949: 2016 Overview 222

## **Quality: Instructor-Led Training**

Failure Modes and Effects Analysis (FMEA)  
Quality / Statistical Process Control (SPC)  
Root Cause Analysis

## **Sample of Knowledge Edge® Content**

What Lean Means (video)  
Kaizen Event Fieldbook (eBook)  
Mapping Your Value Stream (video)  
Strategic Project Management (eBook)  
Managing Teams in Manufacturing (video)

# MACHINING

## **Machining: Instructor-Led Training**

Bearings/Gears  
CNC Fundamentals  
Industrial Safety / Low Voltage Safety  
Robotics  
Programmable Logic Controllers (PLCs)

## **Abrasives: Online Classes**

Intro to Abrasives 100  
Grinding Processes 201  
Grinding Safety 211  
Basic Grinding Theory 221  
Basics of the Surface Grinder 231  
Basics of the Cylindrical Grinder 232  
Basics of the Centerless Grinder 233  
Setup for the Surface Grinder 241  
Setup for the Cylindrical Grinder 242  
Setup for the Centerless Grinder 243  
Surface Grinder Operation 251  
Cylindrical Grinder Operation 252  
Centerless Grinder Operation 253  
Introduction to Grinding Fluids 261  
Grinding Variables 301  
Grinding Ferrous Metals 311  
Grinding Nonferrous Metals 321  
Grinding Wheel Materials 331  
Dressing and Truing 341  
Grinding Wheel Selection 351  
Grinding Wheel Geometry 361

## **CNC: Online Classes**

History and Definition of CNC 100  
Intro to CNC Machines 201  
Basics of the CNC Lathe 211  
Basics of the CNC Mill 212  
Basics of the CNC Swiss-Type Lathe 135  
Coordinates for the CNC Lathe 221  
Coordinates for the CNC Mill 222  
Basics of G Code Programming 231  
Intro to CAD and CAM for Machining 241

Control Panel Functions for the CNC Lathe 251  
Control Panel Functions for the CNC Mill 252  
Offsets on the CNC Lathe 261  
Offsets on the CNC Mill 262  
CNC Specs for the Mill 220  
CNC Specs for the Lathe 225  
Creating a CNC Turning Program 301  
Creating a CNC Milling Program 302  
Calculations for Programming the Lathe 311  
Calculations for Programming the Mill 312  
Canned Cycles for the Lathe 321  
Canned Cycles for the Mill 322

## **CNC Control–Fanuc: Online Classes**

Fanuc Mill: Control Panel Overview 250  
Fanuc Lathe: Control Panel Overview 255  
Fanuc Mill: Entering Offsets 260  
Fanuc Lathe: Entering Offsets 265  
Fanuc Mill: Locating Program Zero 270  
Fanuc Lathe: Locating Program Zero 275  
Fanuc Mill: Program Execution 280  
Fanuc Lathe: Program Execution 285  
Fanuc Mill: Program Storage 310  
Fanuc Lathe: Program Storage 315  
Fanuc Mill: First Part Runs 320  
Fanuc Lathe: First Part Runs 325

## **CNC Control–Haas: Online Classes**

Haas Mill: Control Panel Overview 250  
Haas Lathe: Control Panel Overview 255  
Haas Mill: Entering Offsets 260  
Haas Lathe: Entering Offsets 265  
Haas Mill: Locating Program Zero 270  
Haas Lathe: Locating Program Zero 275  
Haas Mill: Program Execution 280  
Haas Lathe: Program Execution 285  
Haas Mill: Program Storage 310  
Haas Lathe: Program Storage 315  
Haas Mill: First Part Runs 320  
Haas Lathe: First Part Runs 325

# MACHINING (CONTINUED)

## **CNC Control–Mazak: Online Classes**

Mazak Mill: Control Panel Overview 250  
Mazak Lathe: Control Panel Overview 255  
Mazak Mill: Safety for the Mill 260  
Mazak Lathe: Safety for the Lathe 265  
Mazak Mill: Locating Program Zero 270  
Mazak Lathe: Locating Program Zero 275  
Mazak Mill: Entering Offsets 280  
Mazak Lathe: Entering Offsets 285  
Creating an EIA/ISO Program for the Mazak Mill 286  
Creating an EIA/ISO Program for the Mazak Lathe 287  
Creating a Mazatrol Program for the Mill 288  
Creating a Mazatrol Program for the Lathe 289  
Mazak Mill: Program Execution 290  
Mazak Lathe: Program Execution 295  
Mazak Mill: Program Storage 310  
Mazak Lathe: Program Storage 315  
Mazak Mill: First Part Runs 320  
Mazak Lathe: First Part Runs 325

## **CNC Control: Online Classes**

Control for the Mill 201  
Control for the Lathe and Multitasking Machine 202

## **Manual Machining: Online Classes**

Manual Mill Basics 201  
Engine Lathe Basics 211  
Manual Mill Setup 221  
Engine Lathe Setup 231  
Benchwork and Layout Operations 241  
Manual Mill Operation 251  
Engine Lathe Operation 261  
Holmaking on the Mill 271  
Threading on the Engine Lathe 301  
Taper Turning on the Engine Lathe 240

## **Metal Cutting: Online Classes**

Safety for Metal Cutting 101  
Cutting Processes 111  
Overview of Machine Tools 121  
Basic Cutting Theory 201  
Intro to Screw Machining 160  
Band Saw Operations 211

Intro to Metal Cutting Fluids 221  
Metal Cutting Fluid Safety 231  
Prints for Metal Cutting Operations 241  
Toolholders for Turning 260  
Speed and Feed for the Lathe 301  
Speed and Feed for the Mill 311  
Cutting Tool Materials 321  
Carbide Grade Selection 331  
ANSI Insert Selection 341  
Advanced Tool Materials 345  
Lathe Tool Geometry 351  
Mill Tool Geometry 361  
Drill Tool Geometry 371  
Optimizing Tool Life and Process 381  
Impact of Workpiece Materials 391  
High-Speed Machining 310  
Hard Turning 315  
Machining Titanium Alloys 325  
Intro to EDM 100

## **Workholding: Online Classes**

Intro to Workholding 101  
Supporting and Locating Principles 106  
Locating Devices 107  
Clamping Basics 108  
Chucks, Collets, and Vises 110  
Fixture Body Construction 200  
Fixture Design Basics 210  
Drill Bushing Selection 230

## **Sample of Knowledge Edge® Content**

High-Speed Machining (eBook)  
Cutting Tool Geometries (video)  
Milling and Machining Centers (video)  
Parametric Programming for Computer Numerical Control Machine Tools and Touch Probes (eBook)  
Precision Machine Design (eBook)

# MAINTENANCE

## **Maintenance: Instructor-Led Training**

Basic Electronics  
Industrial Safety / Low Voltage Safety  
Programmable Logic Controllers (PLCs)  
Robotics

## **Electrical Systems: Online Classes**

Electrical Units 101  
Safety for Electrical Work 111  
Introduction to Circuits 201  
Introduction to Magnetism 211  
DC Circuit Components 221  
NEC Overview 231  
AC Fundamentals 241  
Electrical Instruments 251  
Electrical Print Reading 261  
DC Power Sources 271  
AC Power Sources 281  
Conductor Selection 291  
Series Circuit Calculations 201  
Parallel Circuit Calculations 311  
Battery Selection 321

## **Hydraulics & Pneumatics: Online Classes**

Intro to Fluid Systems 100  
The Forces of Fluid Power 201  
Safety for Hydraulics and Pneumatics 211  
Introduction to Hydraulic Components 221  
Introduction to Pneumatic Components 231  
Introduction to Fluid Conductors 241  
Fittings for Fluid Systems 251  
Preventive Maintenance for Fluid Systems 261  
Hydraulic Power Variables 301  
Hydraulic Power Sources 302  
Pneumatic Power Variables 311  
Pneumatic Power Sources 312  
Hydraulic Control Valves 341  
Hydraulic Schematics and Basic Circuit Design 342  
Pneumatic Control Valves 351  
Pneumatic Schematics and Basic Circuit Design 352  
Actuator Applications 361  
Hydraulic Fluid Selection 371  
Contamination and Filter Selection 381  
Hydraulic Principles and System Design 391

## **Mechanical Systems: Online Classes**

Introduction to Mechanical Systems 101  
Safety for Mechanical Work 111  
Forces of Machines 121  
Lubricant Fundamentals 130  
Mechanical Power Variables 202  
Power Transmission Components 201  
Bearing Applications 221  
Spring Applications 231  
Belt Drive Applications 241  
Clutch and Brake Applications 250  
Gear Applications 251  
Gear Geometry 261

## **Rigging: Online Classes**

Intro to Machine Rigging 110  
Rigging Equipment 120  
Lifting and Moving Equipment 130  
Rigging Inspection and Safety 210  
Rigging Mechanics 220

## **Motor Controls: Online Classes**

Relays, Contactors, and Motor Starters 201  
Control Devices 211  
Distribution Systems 221  
Limit Switches and Proximity Sensors 231  
Intro to Electric Motors 301  
Symbols and Diagrams for Motors 311  
Logic and Line Diagrams 312  
DC Motor Applications 321  
AC Motor Applications 322  
Solenoids 331  
Reversing Motor Circuits 341  
Motor Drive Systems and Maintenance 347  
Electrical Maintenance for Motor Drive Systems 348  
Mechanical Maintenance for  
Motor Drive Systems 349  
Specs for Servomotors 330  
Timers and Counters 340  
Electronic Semiconductor Devices 350  
Photonic Semiconductor Devices 355  
Limit Switches and Proximity Sensors 360  
Photoelectric and Ultrasonic Devices 365  
Reduced Voltage Starting 370  
Solid-State Relays and Starters 375  
Deceleration Methods 380  
Acceleration Methods 385

# MAINTENANCE (CONTINUED)

## **PLCs—Allen Bradley/Rockwell: Online Classes**

Intro to PLCs 200  
Hardware for PLCs 210  
Basics of Ladder Logic 220  
Numbering Systems and Codes 230  
PLC Inputs and Outputs 240  
Basic Programming 250  
PLC Timers and Counters 260  
Networking for PLCs 270  
Hand-Held Programmers of PLCs 280  
PLC Diagrams and Programs 300  
Overview of PLC Registers 305  
PLC Program Control Instructions 310  
Math for PLCs 320  
Sequencer Instructions for PLCs 330  
PLC Installation Practices 340  
PID for PLCs 350  
Data Manipulation 360  
Shift Registers 370

## **PLCs—Siemens: Online Classes**

Basics of Siemens PLCs 200  
Siemens PLC Hardware 210  
Numbers, Codes, and Data Types for Siemens PLCs 220  
Siemens PLC Communication 230  
Siemens Human Machine Interfaces 250  
Siemens PLC Inputs and Outputs 240  
Siemens SIMATIC Modular PLCs 260  
Siemens PLC Programming Concepts 270  
Basic Ladder Diagram Programming for Siemens PLCs 280  
Basic Function Block Diagram Programming for Siemens PLCs 290  
Ladder Diagram Timers and Counters for Siemens PLCs 300  
Function Block Diagram Timers and Counters for Siemens PLCs 310  
Additional Ladder Diagram Instructions for Siemens PLCs 320  
Additional Function Block Diagram Instructions for Siemens PLCs 330

Siemens SIMATIC S7-1200 PLCs 340  
Siemens SIMATIC S7-1500 PLCs 350  
Siemens Safety Integrated for  
Factory Automation 360

## **Robotics: Online Classes**

Introduction to Robotics 201  
Robot Safety 211  
Robot Components 120  
End Effectors 125  
Applications for Robots 130  
Automated Systems and Control 135  
Robot Axes 140  
Robot Sensors 150  
Robot Troubleshooting 331  
Robot Maintenance 170  
Concepts of Robot Programming 341  
Robotic Drives, Hardware, and Components 220  
Robot Installations 230  
Robotic Control Systems 240  
Vision Systems 250  
Industrial Network Integration 260

## **Sample of Knowledge Edge® Content**

Die Maintenance Handbook (eBook)  
TPM: Total Productive Maintenance Industrial  
Robotics (video)  
Autonomous Activities (video)



# WELDING

## Welding: Online Classes

What Is Oxyfuel Welding? 100  
Oxyfuel Welding Safety 105  
Welding Safety Essentials 101  
PPE for Welding 111  
Welding Fumes and Gases Safety 121  
Electrical Safety for Welding 131  
Introduction to Welding 141  
What Is Arc Welding? 110  
Introduction to Welding Processes 151  
Arc Welding Processes 120  
Math Fundamentals for Welding 161  
Geometry Fundamentals for Welding 171  
Material Tests for Welding 201  
Welding Ferrous Metals 211  
Welding Nonferrous Metals 212  
Overview of Weld Types 221  
Overview of Weld Defects 222  
Welding Symbols and Codes 231  
Fabrication Process 232  
Electrical Power for Arc Welding 241  
Introduction to GMAW 251  
Introduction to SMAW 252  
Introduction to FCAW 261  
Introduction to GTAW 262  
Introduction to Submerged Arc Welding 160  
Arc Welding Power Sources 260  
Overview of Soldering 271  
Thermal Cutting Overview 281  
Oxyfuel Cutting Applications 282  
Plasma Cutting 283  
Intro to Automation 291  
GMAW Applications 301  
Advanced GMAW Applications 302  
SMAW Applications 311  
FCAW Applications 321  
GTAW Applications 331  
Oxyfuel Welding Applications 207  
SAW Applications 255  
Arc Welding Aluminum Alloys 310

## Sample of Knowledge Edge® Content

Chapter 13: Welding Process (eChapter)  
    Advanced Robotic Welding  
Chapter 26: Welding/Joining (eChapter)  
Chapter 10: Estimating Welding Costs (eChapter)  
    Welding Intro



# ADDITIVE MANUFACTURING

## **Additive Manufacturing: Online Classes**

Intro to Additive Manufacturing 110  
Additive Manufacturing Safety 121  
The Basic Additive Manufacturing Process 131  
Additive Manufacturing Methods and Materials 141  
Design for Additive Manufacturing 201  
Additive Manufacturing Materials Science 211  
Integrating Additive Manufacturing with Traditional Manufacturing 221  
Additive Manufacturing as a Secondary Process 231

## **Additive Manufacturing: Instructor-Led Training**

Implementation and Best Practices of Additive Manufacturing  
Mastering the Fundamentals of Additive Manufacturing

## **Sample of Knowledge Edge® Content**

Advanced Additive Manufacturing Materials (tech paper)  
Metal Powders for Additive Manufacturing (tech paper)  
Rapid Prototyping (video)  
Medical Applications of Rapid Prototyping (video)  
Advances and New Technologies in Additive Manufacturing of Metals (tech paper)

# STAMPING/FORMING/ FABRICATING

## **Stamping: Online Classes**

Press Basics 110  
Stamping Safety 115  
Punch and Die Operations 120  
Die Components 130  
Coil Handling Equipment 140  
Die Cutting Variables 200  
Monitoring Press Operations 220  
Guiding System Components 230  
Stripper System Components 235

## **Stamping: Instructor-Led Training**

Metal Formability  
Metal Stamping Press Maintenance  
Stamping Dies

## **Press Brake: Online Classes**

Press Brake Safety 100  
Press Brake Components 110  
Bending Fundamentals 120  
Die Bending Operations 130  
Operating the Press Brake 200  
Press Brake Specifications 220

## **Sample of Knowledge Edge® Content**

Press Brake Technology (eBook)  
Punch Presses (video)  
Quick Die Change (eBook)  
Laser Cutting Guide for Manufacturing (eBook)  
New Technologies in Forming and Fabricating (tech paper)



# COMPOSITES PROCESSING

## Composites: Online Classes

Intro to Composites 110  
Safety for Composite Processing 115  
Overview of Composite Processes 120  
Traditional Composites 125  
Advanced Thermoset Resins for Composites 130  
Advanced Materials for Composites 135  
Intro to Lay-up and Spray-up Molding 140  
Intro to Compression Molding 170  
Surface Finishing Composites 190  
Vacuum Bagging Technique:  
    Single-Sided Bagging 230  
Composite Inspection and Defect Prevention 240  
Repair Methods for Composites 250

## Composites: Instructor-Led Training

Intro to Composites

## Sample of Knowledge Edge® Content

Intro to Composites Technology (eBook)  
Automated Composite Layup and Spray Up (video)  
Filament Winding (video)  
Successful Composites Technology Transfer: Applying  
    NASA Innovations to Industry (eBook)  
Composites Post Fabrication and Joining (video)

# ASSEMBLY/FINAL STAGE PROCESSES

## Adhesives: Online Classes

Intro to Adhesive Bonding 110  
Basics of the Bonding Process 120  
Intro to Adhesive Properties 130  
Types of Adhesives 140  
Surface Preparation 210  
Steps for Adhesive Application 220

## Coatings: Online Classes

Intro to Coating Composition 110  
Surface Preparation for Coatings 120  
Processes for Applying Coatings 140  
Coating Defects 150  
Troubleshooting Coating Defects 170

## Fasteners: Online Classes

Intro to Assembly 100  
Safety for Assembly 105  
Intro to Fastener Threads 110  
Overview of Threaded Fasteners 117  
Tools for Threaded Fasteners 120  
Overview of Non-Threaded Fasteners 125  
Intro to Fastener Ergonomics 130  
Properties for Fasteners 200  
Understanding Torque 210  
Threaded Fastener Selection 215

## Soldering: Online Classes

What is Soldering? 110  
Safety for Soldering 115  
Soldering Equipment 130  
Soldering Applications 200  
Solder and Flux Selection 210  
Soldering PCBs 220  
Lead-Free Soldering 230

## Sample of Knowledge Edge® Content

Successful Assembly Automation (eBook)  
Plastics Machining and Assembly (video)  
Fastening and Assembly (video)  
Brazing and Soldering (video)  
Design for Manufacture and Assembly  
    (DFMA) (video)

# DESIGN & ENGINEERING

## **Design & Engineering: Instructor-Led Training**

Blueprint Reading  
Design for Manufacturing/Design for Assembly (DFM/DFMA)  
Failure Modes and Effects Analysis (FMEA)  
Geometric Dimensioning & Tolerance (GD&T)  
Precision Machine Design  
Root Cause Analysis  
Value Stream Mapping

## **Sample of Knowledge Edge® Content**

Lean Product Development (video)  
Measurement and Gaging (video)  
Gaging and Inspection Tool Design (video)  
Design for Manufacture and Assembly (DFMA) (video)  
DFM: Design for Manufacturing (video)

# LEADERSHIP

## **Supervisor Essentials: Online Classes**

Essentials of Leadership 110  
Essentials of Communication 120  
Managing Performance: Best Practices 130  
Managing Performance: Corrective Actions 135  
Basics of Manufacturing Costs 140  
Intro to Managerial Accounting 145  
Conflict Resolution Principles 150  
Conflict Resolution for Different Groups 155  
Team Leadership 160  
Manufacturing Management 180  
Personal Effectiveness 190  
Managing the Diverse Workplace 210  
Harassment and Discrimination 215  
Performance Management and the Law 230

## **Supervisor Essentials: Instructor-Led Training**

Coaching and Mentoring for Front Line Supervisor (FLS)  
Front Line Supervisor (FLS) Leadership Skills  
Train-the-Trainer: Accelerating Worker Performance

## **Sample of Knowledge Edge® Content**

Strategic Project Management (eBook)  
Realistic Cost Estimating for Manufacturing, Third Edition (eBook)  
Walking the Talk: Moving into Leadership (eBook)  
Managing Teams in Manufacturing (eBook)  
From Concept to Customer: Portfolio, Pipeline, and Strategic Project Management (eBook)

# LEADERSHIP

# INSTRUCTOR-LED TRAINING

## Real-World Expertise

Successful manufacturers recognize the value in long-time employees using their expertise to mentor less-experienced team members. From startups that lack institutional knowledge, to thriving businesses that have lost veteran workers to retirement, most companies can benefit from the value-added experience of learning from experts.

Bring the real world to your staff with Tooling U-SME Instructor-Led Training. Work with instructors who are knowledgeable, experienced, and have a passion for teaching others about manufacturing. Our instructors offer a depth of industry knowledge that is matched only by their professional experience and their passion for the subject matter.

### Your employees benefit from:

- Engaging with industry experts and practicing professionals
- Learning complex ideas through dynamic exchange
- Experiencing comprehensive coverage combined with hands-on applications
- Combining instructor interaction with other forms of training, such as online
- Enhancing their understanding through peer-to-peer discussions

We have dozens of topics to choose from, including Blueprint Reading, Leadership Skills, Additive Manufacturing, Lean Fundamentals, and many, many more.

## KNOWLEDGE EDGE®

### The exact information you need, exactly when you need it

Knowledge Edge® is an online service that provides comprehensive, validated manufacturing content in multimedia formats and includes more than:

- 1,200 eBooks and chapters
- 700 training videos and clips
- 16,000 technical papers

With Knowledge Edge®, the best manufacturing content is at your fingertips 24/7. Playlists allow you to compile and build unique reference and learning resources for individuals and groups of learners when and where you need it to maximize the power of your training. Content that is typically used for informal learning is now in your hands as part of your formal learning program.

# LEARNING SERVICES

## Tap into the highest level of expertise in workforce development for your training needs.

Tooling U-SME works on-site with your human resources, management, and front-line team members to develop a business case for a training and development program, determine gaps in performance, and build a training strategy that delivers measurable Return on Investment (ROI). As your partner, we can design a custom, competency-based training curriculum with blended learning, build career progression models aligned to pay scales, validate competencies with knowledge tests and skills assessments, and ensure performance standards are measurable and trackable. All of this is aligned to your business goals.

No matter where your organization is in its learning and development path, there's an opportunity to evaluate whether your training is meeting your needs effectively. Whether you need to develop a training program from the bottom up, you need training for a particular piece of equipment or process, or you want to benchmark your existing program, our Learning Services team can analyze your needs and build a custom solution.





# CUSTOMIZATION

## **Forward-thinking organizations invest in custom programs**

Precisely and effectively address your company's proprietary needs and reflect your corporate culture with customized content.

Tooling U-SME offers a range of content customization services that can seamlessly integrate your content into a strategic training plan to make sure your people learn what they need for your organization.

## **Upload Services for Pre-Developed Content**

Use our format guide and templates to convert and upload your pre-existing content for web-based delivery. Your online content fits seamlessly into our system.

## **Complete Content Services from our Design Staff**

Gain access to our own content development resources to transform your expertise into web-based training of the highest quality. Deliver your training to your people, anywhere in the world.

# CUSTOMIZATION

# CERTIFICATIONS

## Knowledge earned. And validated.

Tooling U-SME offers outcome assessments, certifications, and certificate programs that allow you to benchmark your employees' knowledge against an industry-recognized standard. Programs are developed with experienced industry professionals to test effectiveness and provide the validation you need.

### Review Programs

Our online review programs provide a comprehensive review of key concepts for the Certified Manufacturing Technologist (CMfgT) and the Lean Bronze Certifications. Each one provides vocabulary and definitions, interactive exercises, pre- and post-course tests, and a downloadable PDF of each course.

### Certifications

#### Lean Certification

This industry-leading program provides individuals, companies, and educators with a comprehensive and effective roadmap for professional and workforce development that aligns with industry-recognized standards. The program is the result of a partnership among leading non-profit organizations — the Association for Manufacturing Excellence (AME), the Shingo Institute, and SME — that work together as the Lean Certification Alliance to set the standard for operational excellence and workforce improvement. Lean Certification not only helps individuals attain the knowledge, it validates it. Find out more at [sme.org/leancert](http://sme.org/leancert).

**Lean Certification is pursued at the level most appropriate to your participant's career, knowledge, and experience.**

- Lean Bronze Certification focuses on the fundamentals of lean from a tactical perspective.
- Lean Silver Certification integrates lean knowledge with leadership experience.
- Lean Gold Certification focuses on the strategic transformation of an entire enterprise.

#### Certified Manufacturing Technologist (CMfgT)

The CMfgT is an entry-level certification that benefits new manufacturing engineers and experienced manufacturers without other credentials. Pursuing a CMfgT Certification requires a minimum of four years combined manufacturing-related education and/or work experience. Learn more at [sme.org/CMfgT](http://sme.org/CMfgT).

#### Certified Manufacturing Engineer (CMfgE)

Professionals seeking a CMfgE Certification have advanced manufacturing engineering experience, with a minimum of eight years of combined manufacturing-related education and/or work experience, including a minimum of four years of work experience. A professional seeking a CMfgE can qualify with a minimum of eight years of combined manufacturing-related work experience or education. Details available at [sme.org/CMfgE](http://sme.org/CMfgE).

#### Certified Additive Manufacturing

The Certified Additive Manufacturing Fundamentals is the first and only certification validating an individual's knowledge of industry-standard concepts in additive manufacturing, aligning to the updated Body of Knowledge. The additive manufacturing industry is expected to increase exponentially and the certification prepares individuals for success in this rapidly growing field. Learn more at [sme.org/additivemfg](http://sme.org/additivemfg).

# ASSESSMENTS

## Close the skills gap to stay competitive

Effective assessment of knowledge is a critical first step in your overall training plan.

At Tooling U-SME, we know exactly what you need. Our assessments allow you to align competencies, curriculum, and the needs of individual workers so they can study their specific courses in a self-paced learning environment. Assessment questions are derived from our extensive course libraries, which are fully mapped to our industry-proven curriculum.

Effective training establishes a baseline of knowledge for each person, compares that baseline to the knowledge and skill requirements of a role, and then applies the exact amount of training to close the gap, ensuring that the knowledge and skills have been retained and applied on the job. The bottom line is that effective assessment of knowledge is a critical step in your overall training plan.

Assess manufacturing technology, engineering, lean processes and practices, machining, welding, fabrication, maintenance, assembly, foundational skills, and much more using Tooling U-SME's 50+ pre-developed assessments, or we'll work with you to develop assessments based on your specific needs.

**For more information, visit:**

[toolingu.com/training/assessments](http://toolingu.com/training/assessments)



# ASSESSMENTS

## WHY TOOLING U-SME?

- The leader in manufacturing training solutions
- Proven solutions for corporate, education, and government organizations
- A single partner who can assemble the resources necessary to support your initiatives
- More than 85 years of experience in providing learning services, assessment programs, and credential certifications
- Hundreds of thousands of individuals, and over 5,000 companies and 550 educational institutions throughout the global manufacturing community rely upon Tooling U-SME

## UP-TO-DATE CONTENT

We release new and updated content every month. Plus, we have hundreds of classes available in Spanish and dozens translated into simplified Chinese. To view our most current class listings, visit [toolingu.com/catalog](http://toolingu.com/catalog)



email: [info@toolingu.com](mailto:info@toolingu.com) | 866.706.8665 | [TOOLINGU.COM](http://TOOLINGU.COM)

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