



# CLASS CATALOG

*Resources for educators*

ONLINE CLASSES | CERTIFICATIONS | KNOWLEDGE EDGE®



## GET COMPETENCY-BASED LEARNING SOLUTIONS FOCUSED ON PERFORMANCE OUTCOMES

Educational and government organizations nationwide partner with Tooling U-SME® for innovative, engaging, hybrid training that brings students to class ready for hands-on skills training.

In this catalog, you'll find a list of all our course offerings—online training, certification programs, books, and videos.

### Our curriculum is:

- ◆ Built on 80 years of experience in manufacturing
- ◆ The training choice for more than half of Fortune 500® manufacturers
- ◆ Mapped to local, state, and national academic standards and industry certifications

We do so much more than provide curriculum. It's our Tooling U-SME team that makes the difference. Just ask our customers: 96% say they count on our knowledge to help them find the right solutions, and 99% give us the highest ratings on customer service.

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Hundreds of industry-proven online courses provide you with more time to individualize educational plans and provide hands-on instruction.

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Join hundreds of educational institutions that have partnered with us on adult education programs, high school bridge/dual credit programs, and community college certificate and degree programs.

## GOVERNMENT

With Tooling U-SME, you get a partner that has an unmatched knowledge of manufacturing training and extensive experience working with government agencies.

## WORKFORCE DEVELOPMENT

Build a complete manufacturing education program with a partner that has deep experience in education and a long history in manufacturing training.

**How can we help you?** Find out how we can partner with you to develop versatile learning and development training for manufacturing students. Contact us at [info@toolingu.com](mailto:info@toolingu.com) or 866.706.8665.

# FUNCTIONAL AREAS

## Additive Manufacturing

Additive Manufacturing	Intro to additive manufacturing, additive manufacturing safety, additive manufacturing methods and materials
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## Assembly/Final Stage Processes

Adhesives	Intro to adhesive bonding, basics of the bonding process, types of adhesives, surface preparation
Coatings	Intro to coating composition, surface preparation, processes for applying coatings, coating defects
Fasteners	Intro to assembly, safety for assembly, overview of threaded fasteners, torque fastener ergonomics
Soldering	What is soldering?, safety for soldering, soldering equipment, soldering applications

## Composites Processing

Composites	Intro to composites, safety for composites processing, overview of composite processes, materials for composites
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## Foundational

Safety	Intro to OSHA, fire safety and prevention, personal protective equipment, lockout/tagout procedures
Applied Mathematics	Fundamentals, fractions and decimals, units of measurement, basics of tolerance
Materials	Intro to materials, structure of metals, overview of plastic materials, mechanical properties of metals
Inspection	Basic measurement, linear instrument characteristics, basics of the CMM, surface measurement, GD&T, blueprint reading
Quality	Quality overview, ISO 9000 review, approaches to maintenance, lean manufacturing overview

## Machining

Abrasives	Intro to abrasives, what is grinding?, grinding processes, grinding variables, grinding wheel materials
CNC	History and definition of CNC, mechanics of CNC, CNC coordinates, part program, CAD/CAM overview
CNC Controls: Fanuc	Control panel overview, entering offsets, locating program zero, program execution, program storage
CNC Controls: Haas	Control panel overview, entering offsets, locating program zero, program execution, program storage
CNC Controls: Mazak	Control panel overview, entering offsets, locating program zero, program execution, program storage
Manual Machining	Basics of the manual mill, basics of the engine lathe, engine lathe operation, holmaking on the mill
Metal Cutting	Metal removal processes, safety for metal cutting, what is cutting?, machines for metal cutting
Workholding	Intro to workholding, locating devices, clamping basics, fixture body construction, drill bushing selection

# FUNCTIONAL AREAS

Maintenance	
Electrical Systems	Electrical units, safety for electric work, intro to circuits, intro to magnetism, DC circuit components
Hydraulics & Pneumatics	Intro to fluid systems, the forces of fluid power, intro to fluid conductors, fittings for fluid systems
Mechanical Systems	Intro to mechanical systems, safety of mechanical work, forces of machines, lubricant fundamentals
Rigging	Intro to machine rigging, rigging equipment, lifting and moving equipment, rigging mechanics
Motor Controls	Intro to electric motors, logic and line diagrams, DC motor applications, solenoids, AC motor applications
PLCs: Allen Bradley	Intro to PLCs, basics of ladder logic, numbering systems and codes, basic programming
PLCs: Siemens	Numbers, codes and data types for Siemens PLCs, Siemens PLC communication, Siemens SIMATIC modular PLCs, Siemens PLC Programming Concepts
Robotics	Intro to robotics, robot safety, robot components, end effectors, robot axes, robot sensors
Stamping/Forming/Fabricating	
Stamping	Press basics, stamping safety, punch and die operations, die components, die cutting variables
Press Brake	Press brake safety, press brake components, bending fundamentals, die bending operations
Supervisor Essentials	
Supervisor Essentials	Essentials of leadership, managing performance, basics of manufacturing costs
Welding	
Welding	Oxyfuel, SMAW, GMAW, FCAW, Plasma, welding safety, weld types, weld inspection, submerged arc welding, material welding



# ONLINE CLASSES

## Abrasives

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- Intro to Abrasives 100
- What Is Grinding? 110
- Grinding Processes 201
- Grinding Safety 211
- Grinding Variables 200
- Dressing and Truing 230
- 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
- Surface Grinder Operation 251
- Cylindrical Grinder Operation 252
- Centerless Grinder Operation 260
- Setup for Centerless Grinders 320
- Grinding Ferrous Metals 331
- Grinding Nonferrous Metals 341
- Grinding Wheel Materials 331
- Grinding Wheel Geometry 341

## Additive Manufacturing

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- Intro to Additive Manufacturing 110
- Additive Manufacturing Safety 120
- The Basic Additive Manufacturing Process 130
- Additive Manufacturing Methods and Materials 140
- Design for Additive Manufacturing 201
- Additive Manufacturing Materials Science 211
- Integrating Additive Manufacturing with Traditional Manufacturing 221
- Additive Manufacturing as a Secondary Process 231

## Adhesives

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- 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

## Applied Mathematics (formerly Shop Essentials)

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- 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

## CNC

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Basics of the CNC Mill 212 	CNC Specs for the Lathe 225
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Coordinates for the CNC Lathe 221 	Milling Calculations 295
Coordinates for the CNC Mill 222 	Creating a CNC Turning Program 301 
Basics of G Code Programming 231 	Creating a CNC Milling Program 302 
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## CNC Controls: Fanuc

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

## CNC Controls: Haas

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

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Mazak Lathe: Control Panel Overview 255	Creating a Mazatrol Program for the Mill 288
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Mazak Lathe: Safety for the Lathe 265	Mazak Mill: Program Execution 290
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Mazak Lathe: Locating Program Zero 275	Mazak Mill: Program Storage 310
Mazak Mill: Entering Offsets 280	Mazak Lathe: Program Storage 315
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## Coatings

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## Composites

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    Single-Sided Bagging 230  
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## Electrical Systems

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## Fasteners

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## Hydraulics & Pneumatics

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## Inspection

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- Calibration Fundamentals 111
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- Measuring System Analysis 300
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## Manual Machining

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## Materials

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- Introduction to Physical Properties 101
- Introduction to Mechanical Properties 111
- Introduction to Metals 121
- Introduction to Plastics 131
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- Essentials of Heat Treatment of Steel 211
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## Mechanical Systems

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## Metal Cutting

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- Safety for Metal Cutting 101
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### CLASS 2.0

All classes available in Spanish except CLASS 2.0 courses

## THE EXACT INFORMATION YOU NEED, EXACTLY WHEN YOU NEED IT

Knowledge Edge® strengthens manufacturing training and skills development by offering comprehensive, industry-leading expertise with validated content you can tailor to meet your specific objectives, and it increases learning outcomes by offering instructional materials across a variety of media platforms. Knowledge Edge features:

- ◆ 1,200 eBooks and eChapters
- ◆ 700 training videos and clips
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With Knowledge Edge, the best manufacturing content is at your fingertips 24/7. Playlists allow you to maximize the power of your training by compiling and building unique reference and learning resources for students when and where you need them. Content that is typically used for informal learning is now in your hands as part of your formal learning program.

To learn more about Knowledge Edge or see examples of popular playlists, contact Tooling U-SME at 866.706.8665 or [toolingu.com](http://toolingu.com).



# CERTIFICATIONS

## KNOWLEDGE EARNED. AND VALIDATED.

Tooling U-SME offers outcome assessments, certifications, and certificate programs that allow you to benchmark knowledge against an industry-recognized standard. The programs listed were developed with experienced industry professionals to test the effectiveness of the training and provide the validation you need.

## REVIEW PROGRAMS

Our online review programs provide a comprehensive review of key concepts related to the Certified Manufacturing Technologist (CMfgT) and the Lean Bronze Certification. 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 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 four leading non-profit organizations — the American Society for Quality (ASQ), 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 participants' 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 seven years of combined manufacturing-related work experience or education. Details available at [sme.org/CMfgE](http://sme.org/CMfgE).



## **ROLLOUT OF 2.0 ONLINE CLASSES CONTINUES**

Tooling U-SME's legacy online classes continue to be rolled out in our new 2.0 format, which features smaller amounts of onscreen text, rich visual imagery, and increased interactivity. According to the latest instructional design research, students retain more information when online classes contain these features.

As always, we're committed to providing quality and value to our customers and to describing complex manufacturing topics as clearly and concisely as possible.

## **IT'S ALL ABOUT CONNECTIONS**

Tooling U-SME helps connect coursework to students, classrooms to careers, and knowledge to skills. No wonder more than 600 educational organizations partner with us. To connect with us and find out how we're manufacturing the workforce of tomorrow, visit [tooling.com/education](http://tooling.com/education) or call +1.866.706.8665.

# WHY TOOLING U-SME?

- ◆ The leader in manufacturing training
- ◆ Flexible online training appeals to everyone from millennials to seasoned workers
- ◆ Automated grading and homework significantly reduce instructors' administrative duties
- ◆ Programs prepare students for the NAM-endorsed Skills Certification System
- ◆ More than 5,000 companies, 600 educational institutions, and hundreds of thousands of individuals rely on us



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