

## Advanced Computer Numerical Control Techniques for Milling Centers

This course will give a basic understanding of CNC (Computerized Numerical Control) programming and its applications. It will provide the basic principles necessary to begin programming the HAAS as well as other CNC Milling Machines. In programming a CNC machine, the tool is controlled by a computer and is programmed with a machine code system that enables it to be operated with minimal supervision and with a great deal of repeatability.

### Objective

This course provides a basic understanding of the control console and the placement of the keys, switches, displays, etc., that are pertinent to the operation of the machine. Participants learn how to set work-piece origin (G54), set tool lengths, write a part program, load a part program, debug and run the part program. Common and potential situations facing both CNC programmer and CNC operator will be emphasized.

### Who Should Attend

This course is designed to benefit anyone interested in a basic understanding of CNC programming and its applications. Participants should have a basic understanding of machining practices and a working knowledge of math.

### Course Content

- HAAS CNC controller components, functions, and interface
- Cartesian coordinate system and relationship with the movement of the CNC axes
- Programming syntax, coding, editing, and storage
- Programming coordinates: absolute and incremental
- Linear and circular interpolation
- Canned cycles
- Cutter compensation
- Planning, writing, and running a part program
- Producing an actual part, including setting work shift offsets and tool setting

**Course length: 2 days**

**CEU credits: 1.6**

**Fee: \$439**



**Tooling U – Basics of CNC Machining Centers**  
130, HAAS Mill: Control Panel Overview 250



## Advanced Computer Numerical Control Techniques for Turning Centers

This course will give a basic understanding of CNC (Computerized Numerical Control) programming and its applications. It will provide the basic programming principles necessary to begin programming the HAAS as well as other CNC Lathes. In programming a CNC machine, the tool is controlled by a computer and is programmed with a machine code system that enables it to be operated with minimal supervision and with a great deal of repeatability.

### Objective

This course provides a basic understanding of the control console and the placement of the keys, switches, displays, etc., that are pertinent to the operation of the machine. Participants learn how to set work-piece origin (G54), set tool lengths, write a part program, load a part program, as well as debug and run the part program. Common and potential situations facing both CNC programmer and CNC operator are emphasized.

### Who Should Attend

This course is designed to benefit anyone interested in a basic understanding of CNC programming and its applications. Participants should have a basic understanding of machining practices, and a working knowledge of math.

### Course Content

- HAAS CNC controller components, functions, and interface
- Cartesian coordinate system and relationship with the movement of the CNC axes
- Programming syntax, coding, editing, and storage
- Programming coordinates-absolute and incremental
- Linear and circular interpolation
- Canned cycles
- Cutter compensation
- Planning, writing, and running a part program
- Producing an actual part, including setting work shift offsets and tool setting

**Course length: 2 days**

**CEU credits: 1.6**

**Fee: \$439**



**Tooling U – Basics of CNC Turning 120, HAAS**  
Lathe: Control Panel Overview 255



## Blueprint Reading For Manufacturing

Blueprints are one of the most important communication tools that a company can possess. Blueprints must communicate ideas to many different people within an organization and, because of this, they must contain critical information about the part. Information takes space, and using “technical shorthand” helps keep this space to a minimum. Not only does the blueprint contain information, it is also a legal document that can be used in a court of law to prove negligence in a lawsuit. For these reasons, the effort to fully understand the blueprint cannot be taken for granted.

### Objective

This course provides participants with an analysis of the general layout of a blueprint and shows them where to look for information. “Technical shorthand” is covered to provide the needed skills to interpret the blueprint and understand what the designer intended. There are frequent classroom exercises throughout to reinforce the learning process with practical applications of concepts.

### Who Should Attend

This course is designed to benefit entry-level machinists, machine operators, assemblers, inspectors, and other manufacturing professionals who are interested in learning how to read blueprints and/or update their knowledge in this area.

### Course Content

- Purpose of blueprints
- Blueprint layout and the information on a blueprint
- Multi-view projection
- Auxiliary and sectional views
- “Technical shorthand” and interpretation
- Dimensioning (fundamental rules) and basic standard applications
- General tolerancing and related principles
- Surface texture requirements

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



**Tooling U – Intro to GD&T 200**



## Computer Numerical Control Fundamentals

Computer Numerical Control Fundamentals is a one-day workshop that provides an overview of the basic concepts required in CNC programming and operations. Hands-on training will be provided on the HAAS simulators. Training on the HAAS mills allows participants to perform basic functions, such as setting a work fixture offset and setting tool lengths. In addition, career opportunities in the field of CNC are addressed.

### Objective

This course provides a basic understanding of concepts required in both CNC programming and operations. Hands-on training will be stressed using both the HAAS simulators and mills.

### Who Should Attend

This course is designed to benefit anyone interested in gaining a basic understanding of CNC operations and how they function.

### Course Content

- CNC system elements
- CNC career opportunities
- Cartesian coordinate system and relationship with the movement of the CNC axes
- Understanding the CNC controller
- Setting work fixture offset
- Setting tool lengths
- Cutter compensation
- Loading and running a part program

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



Tooling U – Mechanics of CNC 110

## Coordinate Measuring Machine Applications (CMMs)

Traditional measuring instruments can provide excellent solutions for the measurement of features such as length, height, width, inside and outside diameters, flatness, roundness, angles, and so on. The problem with traditional measurement techniques is that each measured feature may require individual inspection instruments and individual setups as well as allowing for increased human error. A coordinate measuring machine (CMM) can fill a valuable role in precision measuring because a surface plate, height gauge, and indicator inspection procedure are combined to provide a fast, accurate, and more convenient alternative to the conventional methods for measuring complex parts. The CMM can also be fully automated and linked to a CAD system as well as used to measure and verify Geometric Dimensioning and Tolerancing (GD&T) call outs. It would seem that CMMs offer the answer to all dimensional measurement problems but, is that really true? Will we get precisely the same results as the traditional methods? Measurement with a CMM is a complex process that requires the right training and interpretation of data collected.

### Objective

This course will provide the participants with an appreciation of the principle differences between CMMs and traditional measurement methods. It will focus on developing an understanding of how best to use CMMs to tackle each type of GD&T callout and on important information as to how CMMs really measure and what that means relative to GD&T measurements. There will also be practical tips on how to maximize the accuracy of your CMM.

### Who Should Attend

This course will benefit those responsible for quality, both directly and indirectly, who need to know about the latest techniques as well as metrology, quality, or manufacturing professionals charged with the responsibility of using CMMs to measure machined parts with or without GD&T call outs. Attendees should have a basic working knowledge of GD&T and some familiarity with CMMs.

### Course Content

- Identifying what CMMs do well and how to take advantage of it
- Limitations of CMMs and how to get around them
- How to use CMMs to measure each type of GD&T callout
- Establishing an understanding of CMM use and the possible uncertainty for GD&T measurement
- Discovering some of the difficult geometries to measure and what to do about it
- Developing methods for good designer/inspector communication

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



Tooling U – Basics of CMM 120

## Design for Manufacturing and Assembly

The most significant cost reductions and cost avoidances in manufacturing are those that result from changes to product design, rather than from changes in methods or systems. This course provides a framework for the product engineer and manufacturing engineer to aid them in making these kind of design improvements.

### Objective

This course offers a systematic compilation of the principles of designing products for ease of production and assembly. It will aid the designer in taking advantage of the inherent cost benefits available in the manufacturing processes that will be used.

### Who Should Attend

This course is intended for the product and manufacturing engineers, but is also suitable for value engineers, tool engineers, process engineers, cost reduction engineers, manufacturing supervisors and managers.

### Course Content

- Detailed design recommendations and tips to aid in developing the most producible designs with each process
- Economical use of raw materials
- Formed metal components
- Machined components
- Castings
- Nonmetallic parts
- Assemblies
- Finishes

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



NEW



Tooling U – Intro to GD&T 200

## Dimensioning and Tolerancing Principles for Gauges and Fixtures

ASME Y14.43-2003

The goal of gauging is to accept all good parts and reject all bad parts. Manufacturing of gauging equipment introduces variability, making this impossible. Depending upon the tolerancing policy chosen, the size range of gauge elements may be larger, smaller, or straddle the boundaries they are inspecting. The tolerance policy chosen will determine whether borderline part features are accepted or rejected. The practice of gauge tolerancing requires a gauge designed with size tolerances and/or geometric tolerances as small as economically feasible.

### Objective

This course contains information showing methods for creating gauges and fixtures for features that use principles found in ASME Y14.5M-1994, Dimensioning and Tolerancing. The course addresses GO gauges for measuring maximum material condition and NOGO gauges for measuring least material condition. Fixtures are also addressed as to how to properly simulate datum features. The understanding of proper gauge and fixture design is the key to understanding dimensioning and tolerancing for products in accordance with ASME Y14.5M.

### Who Should Attend

This course is intended for anyone involved in the design and manufacturing of gauges and fixtures including manufacturing supervisors and managers.

### Course Content

- Gauge design
- Dimensioning and tolerancing
- Material condition explanation
- Regardless of feature size
- Usage
- Fixtures
- Diamond pin construction
- Fixed pin construction
- Push pin construction
- Type 1
- Type 2

**Course length: 2 days**

**CEU credits: 1.6**

**Fee: \$529**



Tooling U – Intro to GD&T 200

## GD&T Level II

ASME Y14.5M-1994

Geometric dimensioning and tolerancing (GD&T) is a language for communicating engineering design specifications. When properly applied, GD&T is the language that designers use to translate design requirements into unambiguous and measurable specifications. Conversely, when it is improperly applied, GD&T can be a quandary for manufacturing and quality assurance professionals. For successful implementation of GD&T, it is mandatory that design, manufacturing, and quality assurance professionals have a uniform understanding and interpretation of GD&T and, at the same time, work together as a team to take advantage of all the inherent cost benefits available in the manufacturing/ assembly processes that will be used. The major emphasis of the course is to build upon the Level I course and guide participants through the four basic goals of GD&T, keeping in mind that a functional design is of paramount importance and that a design is not complete if it is not cost effective to manufacture. There will be frequent classroom exercises augmented with the use of models and PowerPoint presentations to ensure a solid grasp of fundamental concepts. The emphasis is on understanding rather than on mundane learning.

### Objective

This course provides participants with a more in-depth treatment of the fundamental concepts, tools, and rules of the ASME Y14.5M-1994 standard and encourages cost effective cooperation among all those involved in the design, manufacturing, and inspection process. This course helps bridge the gap between the “ideal world” and the “practical world.”

### Who Should Attend

This course is designed to benefit design, manufacturing, and quality professionals seeking a thorough review of the ASME Y14.5M-1994 standard, as well as how the standard might be used as a communication tool to improve productivity and product quality in their organizations. Working experience in design, manufacturing, or inspection and a basic understanding of Y14.5M-1994 is beneficial but not required.

### Course Content

- General review of the geometric dimensioning and tolerancing symbols
- Datum referencing
- Features of size with MMC, LMC, or RFS material condition
- Tolerances of location
- Tolerances of form, profile, orientation, and runout
- Functional design
- Cost-effective manufacturing

**Course length: 3 days**

**CEU credits: 2.4**

**Fee: \$729**



Tooling U – Intro to GD&T 200

## Geometric Dimensioning and Tolerancing Consulting

In addition to corporate training, Pueblo Community College's Economic & Workforce Development provides individual consulting services. We can work with your staff, guiding and leading their Checking efforts. Let us work long or short term with your design staff, providing instant expertise in the proper usage of Geometric Dimensioning and Dimensioning to your designs and drawings.

### If you are the design originator, PCC will:

- Apply geometric tolerancing to your design to communicate your requirements
- Review your drawings to check for accuracy and completeness.

### If you interpret your customers' drawings, PCC will:

- Provide the proper interpretation of drawings and discuss manufacturing and inspection techniques.
- Upon your request, discuss design intent with your customer to clarify inconsistencies and inaccuracies on drawings.

 **Call for (719) 549-3320 for additional information and fees.**



## High-Efficiency Metal Cutting

This course introduces the machine operator or technician to the theory of metal working and the importance of the proper selection of tooling, speed and feed, and coolant in the machining process.

### Objective

This course is designed to provide the machine operator or technician with simple rules of thumb, combined with sound judgment in the selection of tooling, insert geometry, size and grade of inserts, depth-of-cut, speed and feed rate, and maximum allowable insert flank wear.

### Who Should Attend

This course is designed for the machine operator or technician who is responsible in both single and multiple part production and needs to understand tooling and the impact on productivity.

### Course Content

- Establishing operating conditions and tool life
- Selecting proper cutting tools
- Selecting inserts
- Physics of metal cutting
- Surface finish
- Analyzing tool life and insert failures
- Trouble shooting

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



**Tooling U – Tool Geometry 240, Milling Geometry 245, Cutting Fluids 210, Speed & Feed election 300**

## Inspection Techniques and Precision Measurements

If you have conflict and dimensional variation in your products, it may be caused by using different methods of inspection and or interpretation. This course clarifies issues of drawing interpretation and correct inspection methods, additionally the course stresses where and when inspection should be done.

### Objective

This course offers a working understanding of correct layout inspection methods as they apply to GD&T intended to give the participants practical experience with GD&T.

### Who Should Attend

This course is ideally suited for manufacturing technicians, engineers and quality control inspectors.

### Course Content

This one-day course provides a review of GD&T, with emphasis on the practical inspection methods with GD&T prints.

- A light review of ASME Y14.5M standard
- The important of Datum's for inspection requirements
- Inspection requirements for form tolerance: straightness, flatness, circularity, and cylindricity
- Orientation Tolerances: Parallelism, perpendicularity and angularity inspection techniques with standard inspection gauging and how to avoid gauging errors
- Runout and calculation for positional tolerances, plus the difficulties with concentricity inspection

**Course Length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



**Tooling U – Hole Inspection 240, Thread Inspection 250**



## Manufacturing Basic Bundle

This course is a combination of key topics that are essential for incumbent employees in a manufacturing setting. In addition, this course is a good refresher for existing employees working in an industrial or manufacturing setting who need to improve their competencies in the areas of mathematics, blueprint reading, inspection techniques, and basic geometric dimensioning and tolerancing.

### Objective

This course provides participants with the fundamentals that are critical in an industrial or manufacturing setting. Upon completion of this course, participants will have a better understanding of areas that impact the bottom line in the manufacturing environment.

### Who Should Attend

This course is designed to benefit entry-level machinists, machine operators, assemblers, inspectors and other professionals who are interested in learning the essentials required in a manufacturing environment.

### Course Content

#### MATHEMATICS

- Order of operations
- Fractions, addition, & subtraction
- Fractions, multiplication, & division
- Decimals
- Pythagorean Theorem
- Triangle measurement
- Circle measurement applications

#### BLUEPRINT READING

- Purpose of blueprints
- Blueprint layout and reading
- Multi-View projections
- Auxiliary and sectional views
- Technical shorthand and interpretation
- Dimensioning and basic standard applications
- General tolerancing and related principles
- Surface texture requirements

#### INSPECTION TECHNIQUES

- History and theory of measurements
- Terminology
- Steel rule and applications
- Micrometer and applications
- Calipers and applications
- Gauges and applications

#### BASIC GEOMETRIC DIMENSIONING & TOLERANCING

- History of GD&T
- Review of basic blueprint reading
- Symbology, terminology and characteristics
- Fundamental usage on a blueprint
- Basic applications
- Brief discussion of "True Position"

**Course length: 2 days**

**CEU credits: 1.6**

**Fee: \$439**



Tooling U – Quality Overview 100, Math Fundamentals 100, Blueprint reading 130

## Mastercam X

Mastercam strips away the clutter and focuses on what's important – your shop. Mastercam's full associability gives you the power to capture your knowledge and build on your experience. Once you program a part – any part – you can modify any element of the job and immediately get updated tool paths without starting over. Mastercam's intelligent NC programming lets you build a library of machining strategies – done the way you want them. Just choose saved operations and apply them to a part; Mastercam adapts them to the new model. It's easy and productive – the way programming should be.

### Objective

Training can be provided to the level of training that suits your needs. Mastercam Level 1 focuses primarily on how to draw and machine basic mill and lathe parts. Mastercam Level 2 covers how to design and program complex 3-D shapes, like molds and aerospace components. Individual modules are designed primarily to sharpen your existing knowledge of Mastercam in specific areas where you may need additional training.

### Who Should Attend

This course is designed to benefit CNC programmers, manufacturing engineers, designers, mold-makers, machinists, or anyone wanting to learn Mastercam. Select the level of training or individual modules that will best suit your needs. (Participants should have existing knowledge of manufacturing processes.)

### Course Content

#### LEVEL ONE

- Computer essentials
- Basic CAD drawing
- Geometry modifications
- Advanced CAD drawings
- Basic contouring
- Basic pocketing
- Drill toolpaths
- Toolpath modifications & verifications
- Advanced pocketing
- Lathe toolpaths

#### LEVEL TWO

- Splines
- Basic surface modeling
- Advanced surface modeling
- Blending surfaces
- Surface finishing machine
- Toolpath projections
- Introduction to solid modeling
- Basic solid modeling
- Advanced solid modeling

**Course length: LEVEL ONE, 2 days  
LEVEL TWO, 2 days**

**CEU credits: 1.6 (per level)**

**Fee: \$439 each level**



Tooling U – CAD/CAM Overview 160

## Metallurgy - As It Pertains To The Heat Treatment Of Metals

### Objective

This course provides for a basic understanding of the heat treatment processes used within industry. It provides a basic understanding of the effects of the hardening and tempering processes commonly used in mill and manufacturing. It explains in detail how metals respond to the heat treatment process on the molecular level, and how the technician can effect and control the results during the process.

### Who Should Attend

This course is designed for anyone that produces steel products that require any form of heat treatment to include hardening, tempering, annealing, normalizing, or any other heat treatment process used in manufacturing.

### Course Content

- Introduction to basic metallurgical structures
- The heat/quench cycle and explanation of the TTT curves
- Process control and atmospheric considerations
- Quench medias and their applications
- Discussion on the pitfalls of the heat treatment processes and an explanation of terms

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



## Optical Comparator Basics

Optical comparators continue to thrive in the manufacturing environment. Comparators can be found in almost all machines shops and have helped create everything from cell phones to hard drives. Comparators can measure many features extremely well and it offers quick, reliable answers, free of complexities.

### Objective

This course addresses the basic components of an optical comparator and how it measures—by motion and comparison.

### Who Should Attend

This course is intended for anyone involved in using an optical comparator to measure part features, it is also suited for manufacturing engineers, tool engineers, process engineers, cost reduction engineers, manufacturing supervisors and managers.

### Course Content

This one-day course covers the basic components of an optical comparator, how it works and how it measures.

- Components of an optical comparator
- Measurements
  - By motion of the part
  - By comparison of the part
- Illumination techniques
  - Direct projection
  - Reflected image (coaxial)
- Edge detection
- Hands-on measurement of features

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



## Reading Shop Prints & Drawings including Introduction to GD&T Level I

ASME Y14.5M-1994

To undertake a career in precision metalworking the craftspeople must learn to understand a new language. That is, to read the blueprint, the universal form of communication in machine shops and manufacturing plants.

### Objective

The objective of this course is to provide the attendees with the proper visualization skills to interpret 3-D parts drawn in 2-D, and understand the various dimensioning schemes found on blueprints. It will also provide the craftspeople with the skill to interpret the symbology use in the ASME Y14.5M-1994 GD&T standard.

### Who Should Attend

This course is well suited for metalworking personnel who must interpret engineering drawings. These include machine operators, quality control inspectors, CNC programmers, shop supervisors and engineering managers.

### Course Content

- Introduction to shop prints
- Lines and their uses in orthographic projections
- Auxiliary views and sectional views
- Dimensioning on drawings
- Geometric Dimensioning and Tolerancing and surface texture requirements
- Metrics and metric drawings
- Castings, forgings, and weldments
- Sketching techniques
- Practical exercises in reading blueprints

**Course length: 2 days**

**CEU credits: 1.6**

**Fee: \$439**



## Society of Manufacturing Engineers Training Courses

Pueblo Community College is now affiliated with the Society of Manufacturing Engineers and can bring their "World-Class" training to your company's location. And, as a result of this partnership, these courses can now be offered at a discounted price. SME's Corporate Training Department offers over 250 relevant topics in manufacturing, engineering, quality, packaging, assembly & joining, electronics, finishing & coating, forming & fabrication, heat treating & metallurgy, lasers, networking & communications, plastics, and management fields.

### About SME

The Society of Manufacturing Engineers is the world's leading professional society supporting manufacturing education through its member programs, publications, expositions, and professional development resources. SME promotes an increased awareness of Manufacturing engineering and helps keep manufacturing professionals up-to-date on leading trends and technologies.

### Course Instructors

SME/CT maintains a resource list of over 300 active instructors who are known as the best in class in their related field. It is SME/CT and PCC's objective to provide our clients with instructors who know their material and know how to communicate with their audience. It doesn't make sense to do it any other way.

### Topics

Even though SME offers over 250 topics, we have targeted the "Top 24" courses that we believe fit the needs of this area's industrial and manufacturing sectors. By combining resources, we can ultimately deliver the best training products for your company's needs. If you don't see what you're looking for, please contact us for a complete listing of courses or visit the SME web site at [www.sme.org/corptrain](http://www.sme.org/corptrain), then call us for special pricing.

### Courses

#### ASSEMBLY & JOINING

Welding Aluminum & Non-Ferrous Metals..... Two-Day  
Welding Codes & Standards Fundamentals..... One-Day

#### AUTOMATED MANUFACTURING

Computer Integrated Manufacturing Strategies... Three Day  
Effective Manufacturing Cells ..... Two-Day

#### FORMING & FABRICATING

Changeover Time Reduction ..... Two-Day  
Setup Reduction for Metal Fabrication Processes Two-Day

#### HEAT TREATING & METALLURGY

Metallurgy & Heat Treatment of Aluminum  
and its Alloys ..... One-Day  
Lasers in Production Operations ..... Three-Day

#### MACHINE DESIGN

Bearing Calculations & Design ..... Two-Day  
Precision Machine Design ..... Two-Day

#### MANUFACTURING MANAGEMENT

Benchmarking ..... One-Day  
Project Management for Engineers ..... Three-Day

#### MATERIAL REMOVAL/MACHINING

Quick Change Tooling and Tool Management Strategy  
for CNC Machining Centers and Lathes ..... Two-Day  
Vibratory and Other Mass Finishing Methods ..... Two-Day

#### MATERIAL OF INTEREST

Mechanical Properties of Materials ..... Two-Day

#### PLANT ENGINEERING, MAINTENANCE AND ERGONOMICS

ISO 14000 ..... One-Day

#### PLASTICS

Designing Injection Molded Parts for Assembly ... Two-Day  
Injection Molding Fundamentals ..... Two-Day

#### PRODUCT DESIGN

Design for Manufacturability and Assembly ..... Two-Day  
Measurement, Inspection and Gauging Level 1 Three-Day

#### QUALITY

ISO 9000 Implementation ..... Two-Day  
QS 9000 Automotive Standard: Implementation .. Two-Day

#### TOOL, FIXTURE AND DIE DESIGN

Designing Low Cost Fixtures for Workholding ..... One-Day  
Modular Fixturing ..... One-Day

 Call Us for Course Pricing Information



## Solidworks 2012

Pueblo Community College along with MCAD Technologies, Inc. has partnered to bring you quality training programs on the popular CAD software SolidWorks 2012. MCAD Technologies, Inc. is an Authorized Training, Testing and Support Center that can provide training with their products here on the college campus through the Economic & Workforce Development Division. Below are a few of the products that can be delivered, for more information and specific pricing please contact a Pueblo Community College or MCAD Technologies, Inc. representative at either of the numbers listed below. Certification through MCAD Technologies, Inc. training is also available.

### Objective

These courses are designed to quickly bring the SolidWorks user up to production level using all the features—beginning to advanced—available within SolidWorks.

### Who Should Attend

This course is designed to benefit anyone using SolidWorks—from the first time user to anyone who has prior knowledge of a CAD system. It is designed for the SolidWorks user who needs to learn all the features of SolidWorks

### Course Content

#### Suites Available:

- SolidWorks
- SolidWorks Professional
- SolidWorks Office Premium

### Courses:

- SolidWorks Essentials — 4 days
- SolidWorks Drawings — 2 days
- Advanced Part Modeling — 2 days
- Advanced Assembly Modeling — 2 days
- Advanced Surface Modeling — 2 days
- Mold Design Using SolidWorks — 1 day
- Sheet Metal — 1 day
- Weldments — 1 day
- SolidWorks Routing — 1 day
- SolidWorks Wiring — 1 day
- SolidWorks File Management — 1 day
- PDMWorks Workgroup Contributor — 1/2 day
- PDMWorks Workgroup Contributor and Viewer — 1/2 day
- PDMWorks Workgroup for Solidworks — 1 day
- PDMWorks Quick Start — 1/2 day
- PDMWorks Quick Start — 1 day
- SolidWorks Core Bundle — 10 days
- SolidWorks Core Bundle and Certification Exam — 11 days
- Modeling Bundle — 8 days
- Essentials Bundle — 6 days
- Advanced Modeling — 4 days
- Routing Bundle — 2 days
- Sheet Metal & Weldments Bundle — 2 days
- COSMOS Premium Bundle — 3 days
- COSMOS Professional Bundle — 4 days



**PCC: 719.549.3320 – Call for Information**  
MCAD technologies, Inc.: 303.969.8844



Tooling U – CAD/CAM  
Overview 160



## Tolerance Stack-up Using GD&T

ASME Y14.5M-1994

This course provides designers and engineers with a tool that will allow them to understand the consequences of tolerance stack-up and their relationship to product performance. Unfortunately, designers often view tolerance stack-up as either a 'black art' that they don't understand or as not a vital part of the total design.

### Objective

This course will introduce participants how to apply tolerance stack-up analysis to a wide variety of assemblies with the objective to create product that:

- Contains parts that fit together well
- Performs desired functions efficiently
- Maximizes tolerances to create a cost effective manufacturing part

### Who Should Attend

This course is directed to anyone with the professional responsibility of analyzing or applying tolerances to assemblies, or anyone seeking a more thorough understanding of tolerance analysis. Attendees should have knowledge of the ASME Y14.5M-1994 standard.

### Course Content

- Basic tolerance stack-up analysis
- Analysis of an assembly using plus and minus tolerancing
- Vertical vs. horizontal analyses for features of size
- Trigonometry and proportions in tolerance stack-up analysis
- Theory of statistical Probability

**Course length: 2 1/2 days**

**CEU credits: 2.0**

**Fee: \$529**



Tooling U – Intro to GD&T 200



Pueblo Community College is proud to be affiliated with Tooling U, the leading provider of online training for manufacturers. Tooling U believes that manufacturers survive based on the talent and expertise of their people and training is the heart of a talented workforce. Pueblo Community College and Tooling U are now combining efforts to bring you the most complete and comprehensive training available. Throughout our catalog you will find our "jump start" icon referring you to this Tooling U page. The courses on this page are a complimentary foundation for our hands on courses. For course fees and more information on these classes please visit the Tooling U website at [www.toolingu.com](http://www.toolingu.com).

### AC Motor Applications 240

This class describes the common parts of AC motors as well as different types and their applications, maintenance, and troubleshooting concerns.

### Basics of Ladder Logic 220

This class describes the basic principles of ladder logic, identifies the symbols used to program a PLC and explains the primary logic functions those symbols create.

### Basics of the CMM 120

This class identifies the major types and components of the coordinate measuring machine and describes the coordinate system.

### Basics of the CNC Machining Center 130

This class describes the basic parts of the machining center as well as the devices used on this machine. ***Includes an Interactive Lab***

### Basics of the CNC Turning Center 120

This class describes the basic parts of the turning center as well as the devices used on this machine. ***Includes an Interactive Lab***

### Blueprint Reading 130

This class identifies the information communicated on a blueprint with emphasis on interpreting the part drawing. ***Includes an Interactive Lab***

### CAD/CAM Overview 160

This class describes the general process of using computers to design and manufacture parts and identifies common features available in CAD/CAM software.

### Calibration Fundamentals 210

This class describes the calibration process and explains how measuring instruments are traced back to national and international standards. ***Includes an Interactive Lab***

### Cutting Fluids 210

This class identifies the major cutting fluids and their common uses.

### DC Motors 230

This class focuses on DC motors, their main parts, and how they are used and maintained.

### Electrical Units 110

This class describes how electricity flows and explains the basic units used to measure electricity.

### Haas Lathe: Control Panel Overview 255

This class describes the various sections of the Haas lathe control panel as well as the steps for powering up, powering down, and homing the machine. ***Includes Haas CNC Simulators***

### Haas Mill: Control Panel Overview 250

This class describes the various sections of the Haas mill control panel as well as the steps for powering up, powering down, and homing the machine. ***Includes Haas CNC Simulators***

### Hole Inspection 240

This class explains different hole characteristics and describes how specific gages are used for different hole inspection applications. ***Includes an Interactive Lab***

### Intro to Electric Motors 200

This class discusses how various types of electric motors are applied throughout industry and the principles behind motor operation.

### Intro to GD&T

This class introduces the fundamental concepts of geometric dimensioning and tolerancing (GD&T) and describes the main types of tolerances included in the standard. ***Includes an Interactive Lab***

### Intro to PLCs 200

This class introduces the parts and operations of programmable logic controllers (PLCs) and describes the functions and different programming languages you will find on most PLCs.

### Intro to Six Sigma 170

This class covers the basic concepts of Six Sigma, including data analysis, types of variation, common and special causes, the roles of Six Sigma team members, and the DMAIC method.

**Lean Manufacturing Overview 130**

This class describes the basic principles of lean manufacturing and compares them to traditional manufacturing approaches. *Includes an Interactive Lab*

**Math: Fundamentals 100**

This class explains how to add, subtract, multiply, and divide to solve a problem following the correct order of operations.

**Mechanics of CNC 110**

This class describes how parts and tools move in CNC systems.

**Milling Geometry 245**

This class identifies and explains the angles that impact a milling operation. *Includes an Interactive Lab*

**Parallel Circuit Calculations 205**

This class introduces the rules and formulas for parallel circuit calculations.

**PLC Inputs and Outputs 240**

This class covers different types, configurations, capacities, and current conversions for PLC I/Os.

**Quality Overview 100**

This class identifies the key components of a quality organization. The relationship between processes and products are explored through different roles in a manufacturing company.

**Series Circuit Calculations 200**

This class covers the formulas and rules for calculating the values of voltage, current, resistance, and power in direct-current series circuits.

**SPC Overview 210**

This class describes the main concepts of statistical process control and explains how to recognize processes that are affected by special causes. *Includes an Interactive Lab*

**Speed and Feed Selection 300**

This class identifies the various speed and feed values used with the lathe and mill and describes how to convert these variables. *Includes an Interactive Lab*

**Statistics 220**

This class covers the main concepts of statistics and relates these concepts to shop situations.

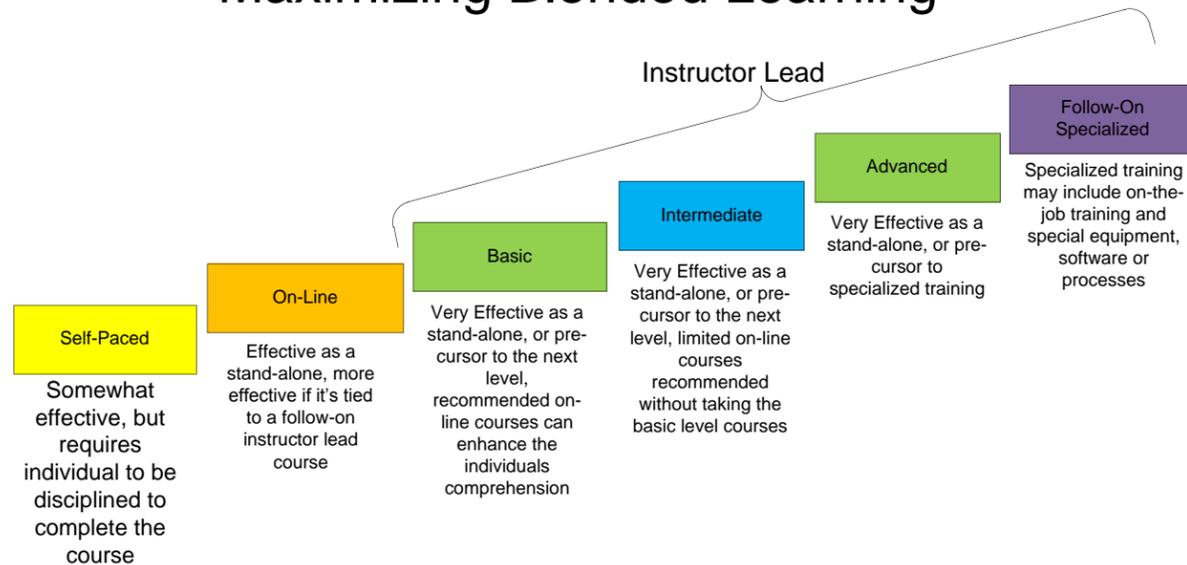
**Thread Inspection 250**

This class describes common screw threads, their standards, and the common methods and devices used to inspect them. *Includes an Interactive Lab*

**Tool Geometry 240**

This class identifies the major angles that impact the turning operation. *Includes an Interactive Lab*

## Maximizing Blended Learning



To provide a more comprehensive approach for training your employees, the workforce development professionals have established strategic partnerships with high quality on-line training organizations such as Tooling University, Ed-2-Go, and others that when blended with instructor lead courses can significantly improve the learning outcomes. On-line courses can also serve as a pre-assessment tool to identify the skill level of your employees prior to training and assist us with the appropriate level of course they should attend. Look for the on-line course icons in this catalog for applicable recommended (but not required) pre-cursor courses.

## Total Productive Maintenance (TPM)

**PROVIDED IN PARTNERSHIP WITH CAMT**

Total Productive Maintenance (TPM) is a series of methods that ensure every piece of equipment in a production process is always able to perform its required tasks so that production is never interrupted. It is a comprehensive, team-based, continuous activity that enhances normal equipment-maintenance activities and involves every worker. TPM focuses on eliminating:

- Downtime
- Performance Losses, and
- Yield Losses

All flow of the product and 'lean manufacturing' improvements are impossible to achieve if there is a lot of equipment downtime. Eliminating downtime becomes a shared goal for the plant and the organization and it is achieved by:

- Improving equipment condition (original condition)
- Shifting some basic maintenance to production (autonomous maintenance)
- Improving and sustaining preventative maintenance (PM program and schedules)
- Creating teams to solve problems (continuous improvement)

**Objective**

This workshop provides a basic understanding of Total Productive Maintenance, and hands-on training will be stressed.

**Who Should Attend**

This course is designed to benefit anyone interested in gaining an understanding of total productive maintenance. Participants should have a basic understanding of machining practices and a working knowledge of math.

**Course Content**

- Classroom training and floor work on operating and evaluating equipment (5S and OEE)
- Classroom and floor work on operating and evaluating equipment (modification, countermeasures, history, safety, and OEE) and discussing predictive tools
- Floor work on cleaning, inspecting, repairing, developing countermeasures and modifying equipment
- Floor work on applying visual controls and developing planned and preventative maintenance checklists
- Floor work on developing a Critical Spare Parts Checklist, and a final presentation to management and co-workers

**Course length: 3 days**

**Fee: \$450**

**Minimum attendees: 12**



## Twist Drills, Reamers, and Rotary Cutting Devices

### Objective

The objective of this course is to provide the student with an expanded understanding of the use, design, construction, maintenance, and application of Drills, Reamers, and other rotary cutting devices.

### Who Should Attend

This course is designed specifically for persons in the mechanical trades, Millwrights, mechanics, machinists, and mechanical apprentices.

### Course Content

- Identification of drill types
- Design considerations and applications of all types of drill bits
- Drill bit maintenance including hand sharpening and machine sharpening
- Reamer types, their uses and applications
- Hole saw types and their applications

**Course length: 1 day**

**CEU credits: 0.8**

**Fee: \$249**



## Bearing Identification

Principles and applications of bearings, bearing seals, lubrication and maintenance practices will be covered in this class at a high level of overview. Friction and anti-friction bearings will be discussed. This course is designed to provide skills in understanding the proper installation and maintenance of bearings and the importance of proper lubrication in various industrial applications. Sizing bearings and their mating shafts or devices will be explored as well as the types of bearings that are used in various applications.

### Objective

This course will provide the participants with the skills to:

- Gain a more in-depth understanding of proper sizing of bearings
- Learn to use common precision measuring tools to measure bearings etc.
- Develop troubleshooting skills by utilizing failure analysis techniques
- Gain a familiarity of use by hands-on exercises
- Understand what lubrication can do to extend or shorten the life of your equipment

### Course Content

- Proper selection of bearings/ Nomenclature
- Friction Bearings
- Anti-friction bearings
  - Roller
  - Tapered roller
  - Ball
  - Cylindrical
  - Spherical
  - Sealed
  - Shielded
- Installation/Shaft and bearing fits
- Dimensions and identification numbers
  - Hands on exercises

**Course length: 2 ½ days**

**CEU credits: 2.0**

**Fee: \$499**



## Fasteners and Screw Threads

This course is designed to provide skills in understanding the proper application and definition of common fastener hardware in various industrial settings with an emphasis on understanding various types of fasteners and threads for the application. Proper installation techniques will be discussed.

### Objective

This course will provide the participants with the skills to:

- Gain a more in-depth understanding of fasteners and screw threads
- Develop troubleshooting skills to determine what can be done to minimize fastener failure
- Understand sizing, calculations and reference data with regards to fasteners and threads

### Course Content

- Different types of fasteners commonly used in the industry
- Fastener designs
- Fasteners types and applications
- Proper care and installation of fasteners
- Proper fastener techniques
- Correct tools for fastener installation
- Understanding fastener failures
- U.S. Thread designations
- U.S. versus Metric thread designations

**Course length: ½ day**

**CEU credits: 0.4**

**Fee: \$129**

### Who Should Attend

This course is designed to benefit maintenance technicians, systems technicians, engineers at an entry level, supervisors in maintenance or any staff involved with the support of mechanical systems.

