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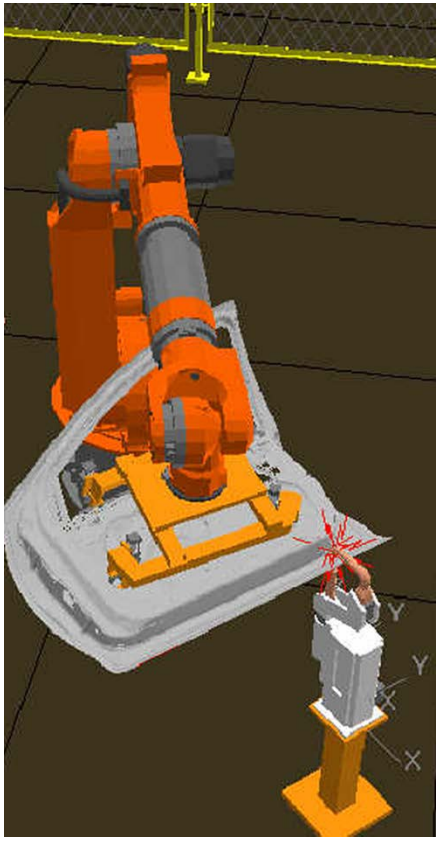
Distance Learning and Simulation Advantage for CNC Students

Reaching out Beyond the Classroom and Lab



David “Otter” Ott Lt Col Ret.
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515.571.9963

Strategic Partners

Support Haas Factory Outlet online training and website portals.

Haas Technical Education Center website and Partner Portal built on Immerse2learn.com software technology.

MastercamU built on Immerse2learn.com Learning Content Management System (LCMS). Immerse2learn.com sells and supports MastercamU online learning and certification.

Delcam University built on Immerse2learn.com Learning Content Management System (LCMS).

Fanuc Mill and Lathe curriculum and virtual CNC emulators.

Implementing NIMS South Africa International Testing system.

National Tooling and Machining Association.
Aptitude testing system and Advanced CNC training.

Over 300 Schools in 2013

- Hawkeye Community College
- Southwestern Illinois College
- Kirkwood Community College
- Plymouth High School
- Calhoun Community College
- Ottawa Intermediate Schools
- Orchard View Technical School
- Saint Clair RESA
- Lenoir Community College
- Randolph Community College
- Guilford Technical College
- BJ Skelton Career Center
- Purdue University
- Rensselaer Polytechnic Institute
- Gateway Community College KY
- Western Iowa Technical Community College
- Michigan Department of Education
- Central Community College
- Pennsylvania College of Technology
- Tennessee Technology Centers
- Lone Star Colleges
- Hennepin Community College
- Dunwoody College
- Saint Paul Community
- Rowan Cabbarus Community College
- Focus Hope
- Vincennes University
- Knox Career Center
- Southern Indiana University

Learning Through Simulation

- Simulation boosts learning rates dramatically

- Study by the National Training Labs (NTL) Institute for Applied Behavior Sciences in Alexandria, VA
  - Students retain 5% of what they hear in lectures
  - 10% of what they read
  - 20% of what they see and hear in audio/visual presentations
  - **Add “practice by doing” and “immediate use”, two learning techniques available in simulations, and retention rates jump to 75%**

- Students learning via simulation based training become more proficient more quickly

Simulation in the Schools, in the Workplace and at Home

- Breaks down the barriers between what we learn and what we do - We practice virtual hands on while learning

- Bring the worlds of industry and education closer together – reaching out through online learning and simulation

- Highly interactive simulations can create massive increases in productivity and knowledge transfer to students and employees

- Instructors move to a higher role of coaching and diagnosing

- Errors and mistakes cause no damage or safety hazards in the virtual world

Computer Simulations in Distance Education

- Computer simulations are essentially representations of real-life systems modeled for virtual exploration

- Simulations can provide students with the means to explore environments that would otherwise be prohibitive due to factors of cost, safety and proximity

- Because **simulations allow exploration and experimentation** they are being more widely used in online learning providing instructors and students an opportunity for **combining the direct virtual experience with the learning environment**

- **Computer simulations make experience possible in a distance learning setting**

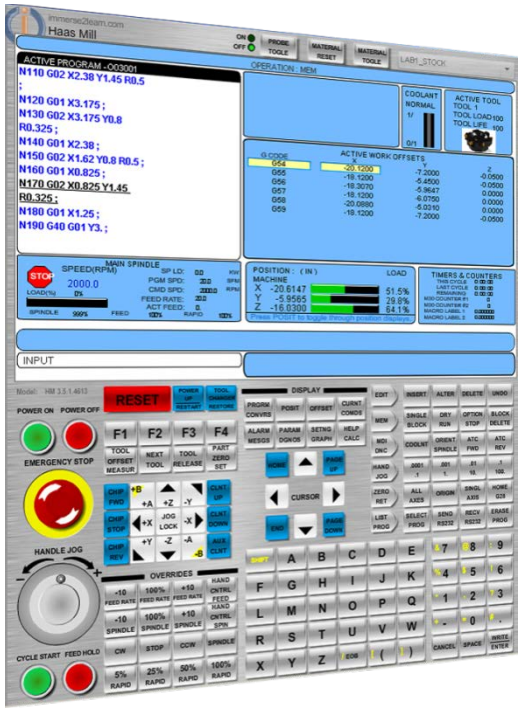
Paper by Les M. Lunce

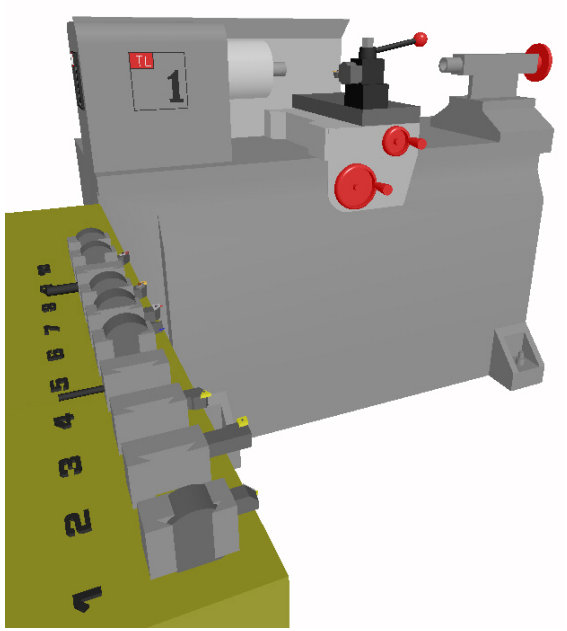
Opportunities for High Schools and Technical Colleges Combining Simulation and Distance Learning

- Options for students enrolled through high school post-secondary agreements

- Mini-courses/workshops with introductory modules BEFORE starting a high school or CC program. Market to parents and students.

- Online Courses to be added to existing courses in Program lineups





Primary Solution Components:

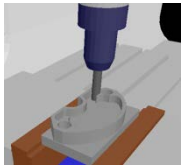
- *Virtual Training Environment (VTE)*
- *Skills Learning Modules*
- *Assessment*
- *Reports*

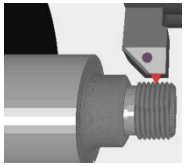
Reality at Your PC- Anywhere!

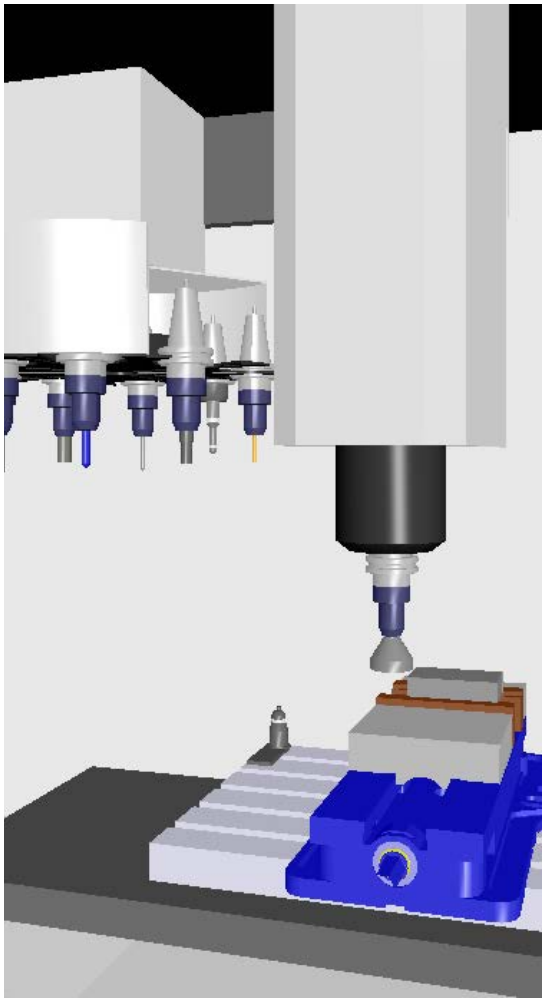
"It is like being at the actual machine and control." -Instructor, Easely, SC

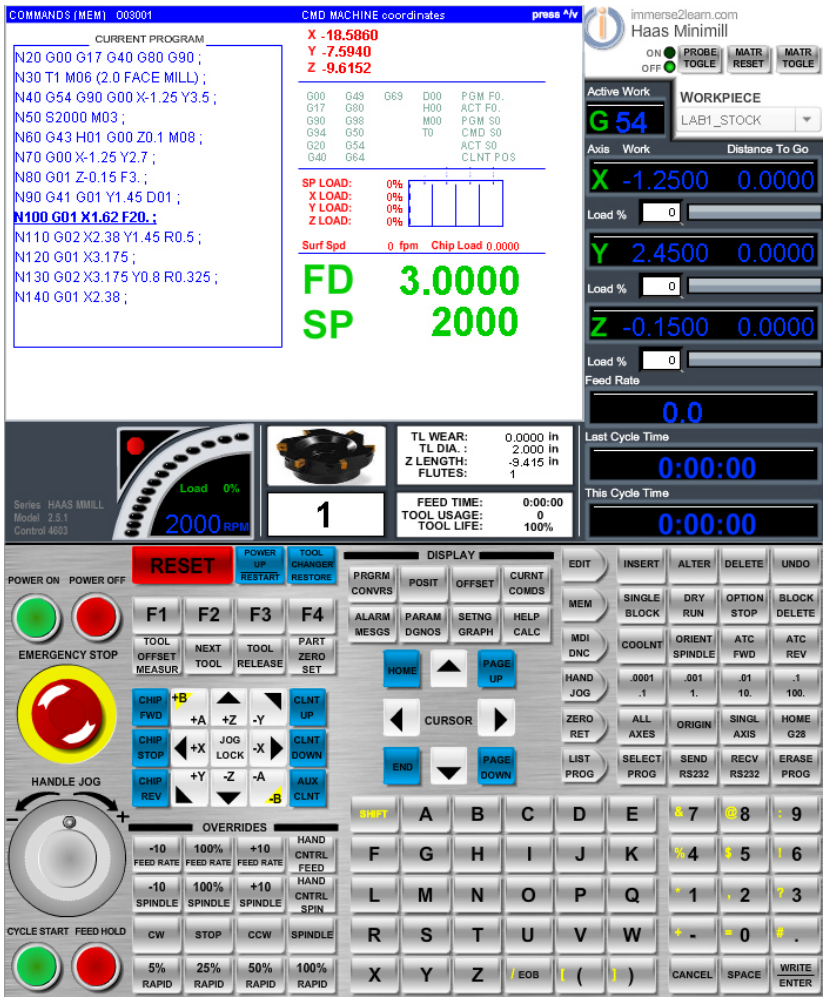
Real-world characteristics accurately mimic actual manufacturing systems:

- Geometric Models
- Motion
- Program Languages
- Control Logics
- Process Times
- Control Alarms
- Control Types: CNC, Robotic, etc.
- Material Removal



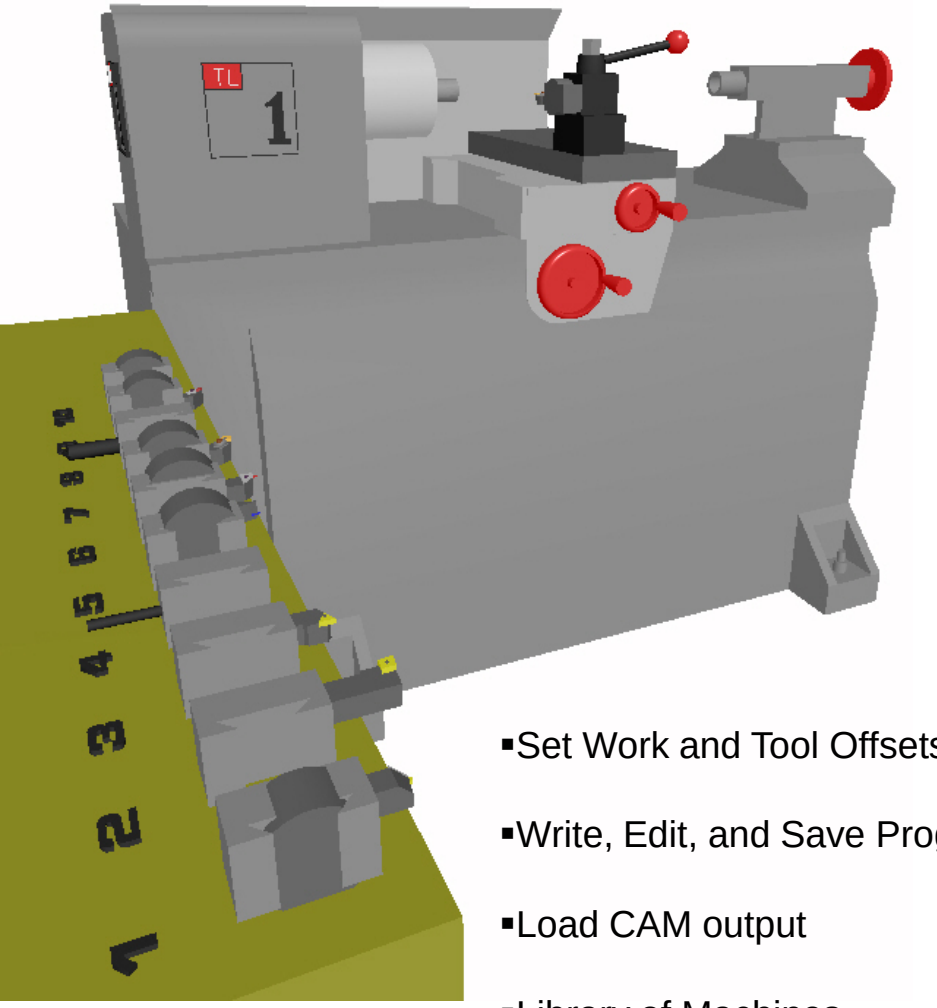




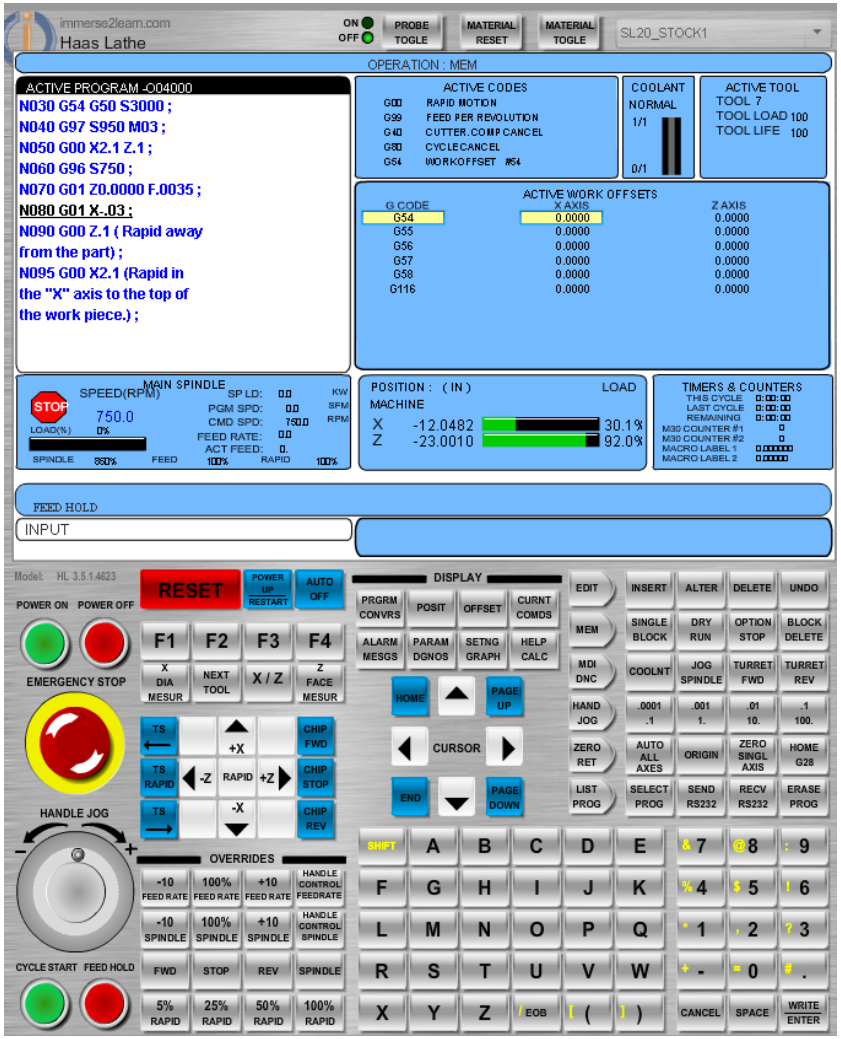


Virtual Training Environment (VTE)

True 3D simulation and emulated controls provide a real-world learning experience.



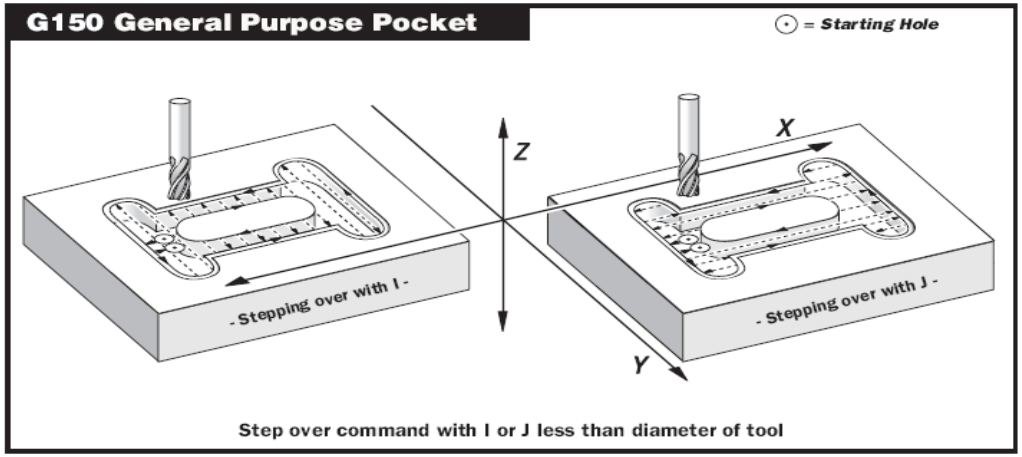
- Set Work and Tool Offsets
- Write, Edit, and Save Programs
- Load CAM output
- Library of Machines

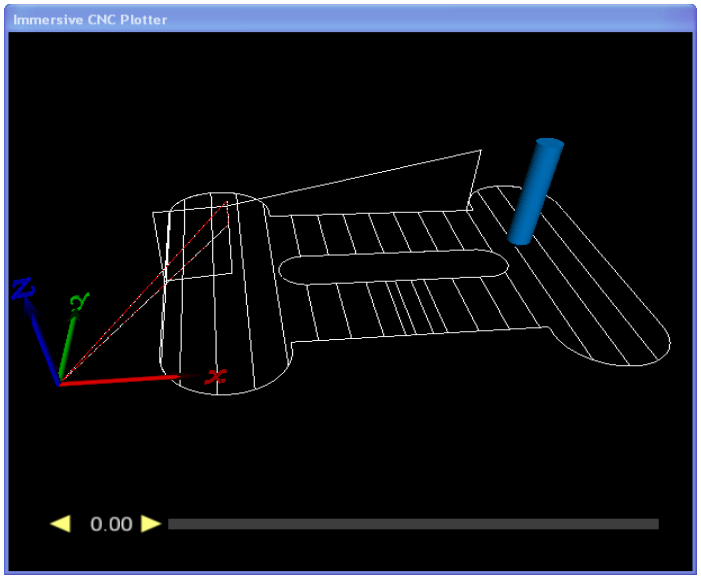


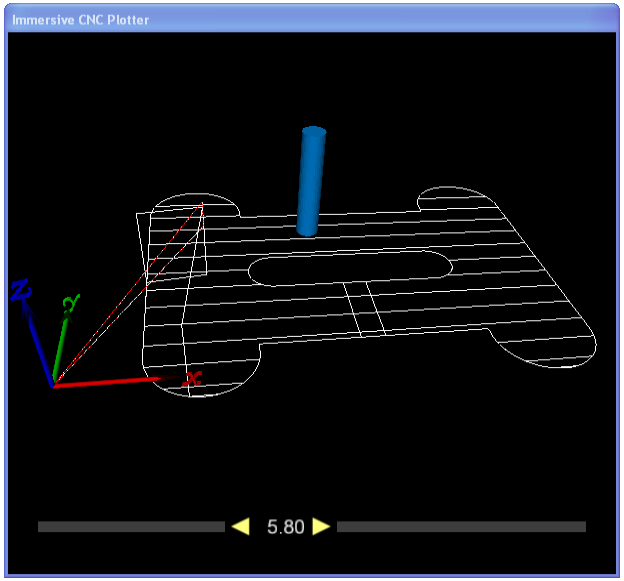
3D Plotter Included

Quickly View Tool Center Line

G150 General Purpose Pocket Milling

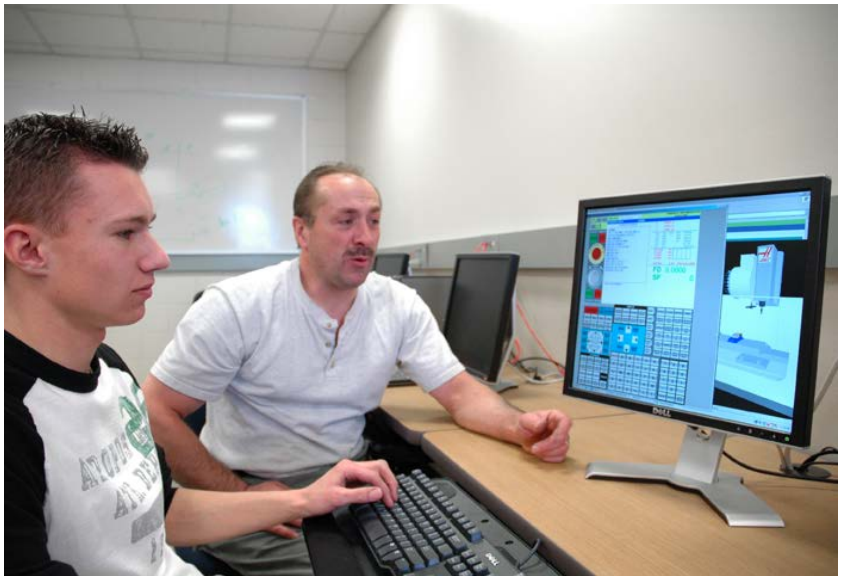


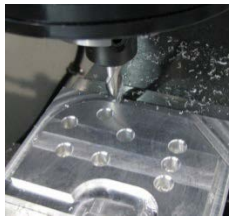


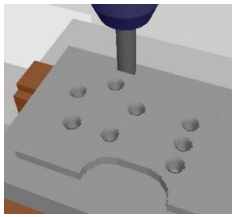


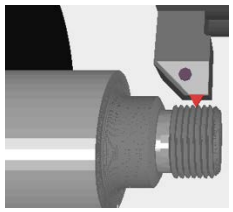
Return on Investment

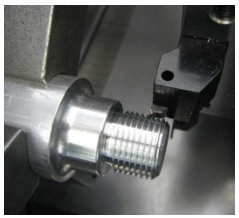
Unlimited access to train and rehearse in a virtual environment enables students to develop greater confidence and proficiency prior to performing actual procedures and operating actual equipment.







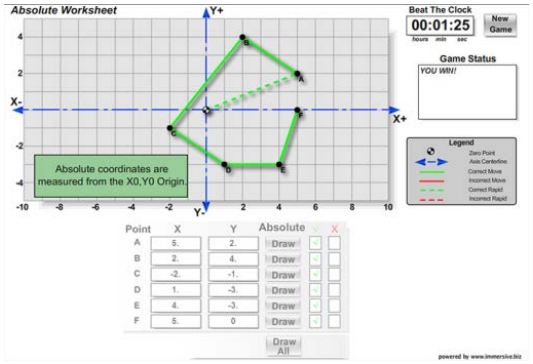


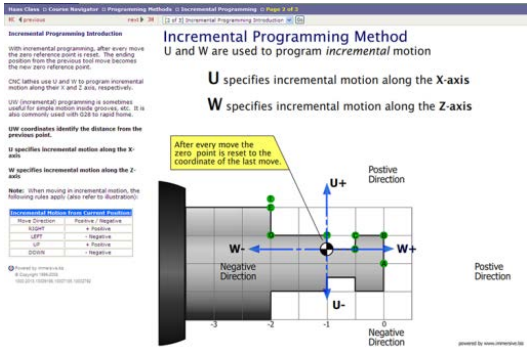


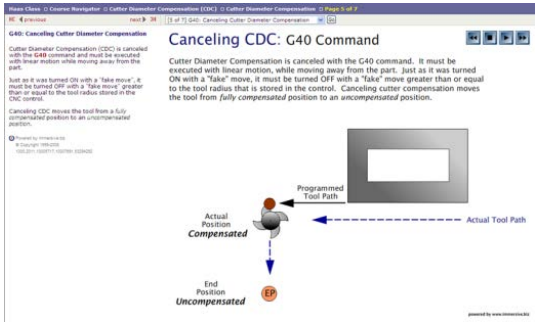
- Overcome barriers: student equipment ratio, location, etc.
- Increase Training Contact time with equipment
- Minimize risk of damaging equipment or incurring injuries

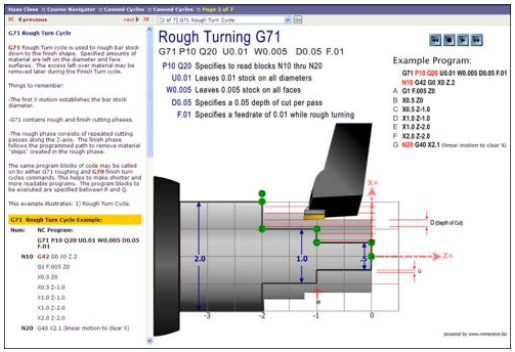
Skills Learning Modules

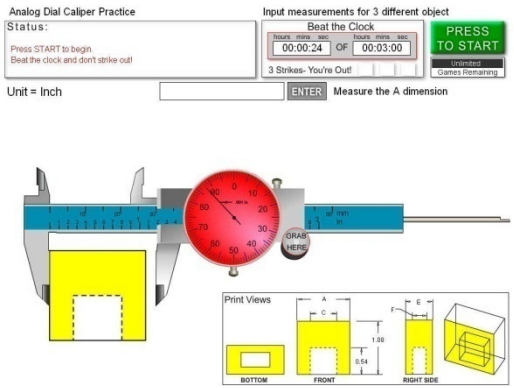
- Step-by-step instruction
- Lessons aligned to skills assessment
- Building-block" exercises prepare student for actual machine time
- Sample Skills Modules:
  - Introduction
  - Safety for Machining
  - Shop Math Level I
  - Shop Math Level II
  - Blueprint Reading w/GD&T
  - Precision Measurement Devices
  - Machinist Calc Pro
  - Feeds and Speeds
  - Mill Control Interface
  - Mill Setup
  - Mill Programming
  - Lathe Control Interface
  - Lathe Setup
  - Lathe Programming
  - Mastercam Mill
  - Mastercam Lathe
  - Advanced CNC, Dies and Molds

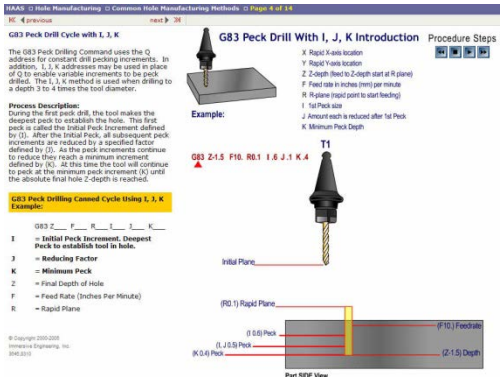












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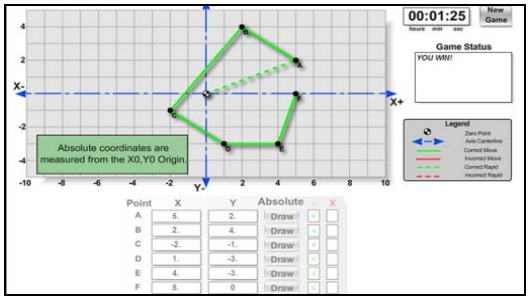
Industry Standard Content

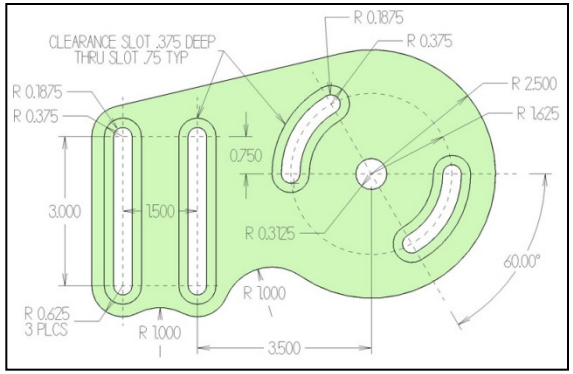
Learn CNC for Haas or Fanuc

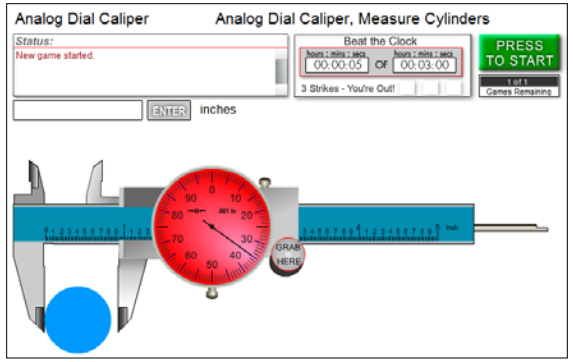
- Introduction
- Safety for Machining
- Shop Math Level I
- Shop Math Level II
- Blueprint Reading
- Precision Meas. Devices
- Machinist Calc Pro
- Feeds and Speeds
- Mill Control Interface
- Mill Setup
- Mill Programming
- Lathe Control Interface
- Lathe Setup
- Lathe Programming
- Lathe Intuitive Programming
- Mill Intuitive Programming



Learn CAM for Mastercam X6/7

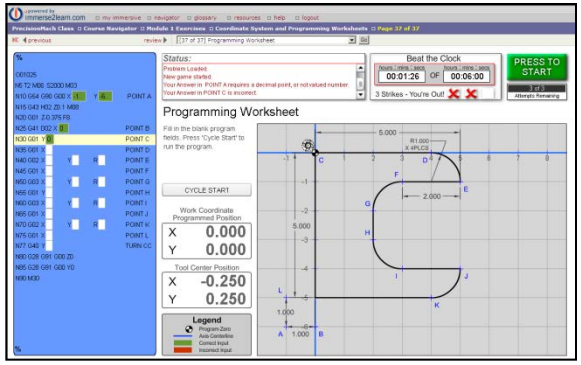
- Principles of Machining
- Mill Design and Tool Path
- Lathe Design and Tool Path
- Advanced Mill Design and Tool paths
- Multi axis-
  Curve Drill and Circle Mill





Learn Advanced Manufacturing

- CNC multi axis Mill and Drill
- Plastic Injection Molds
- Stamping Dies



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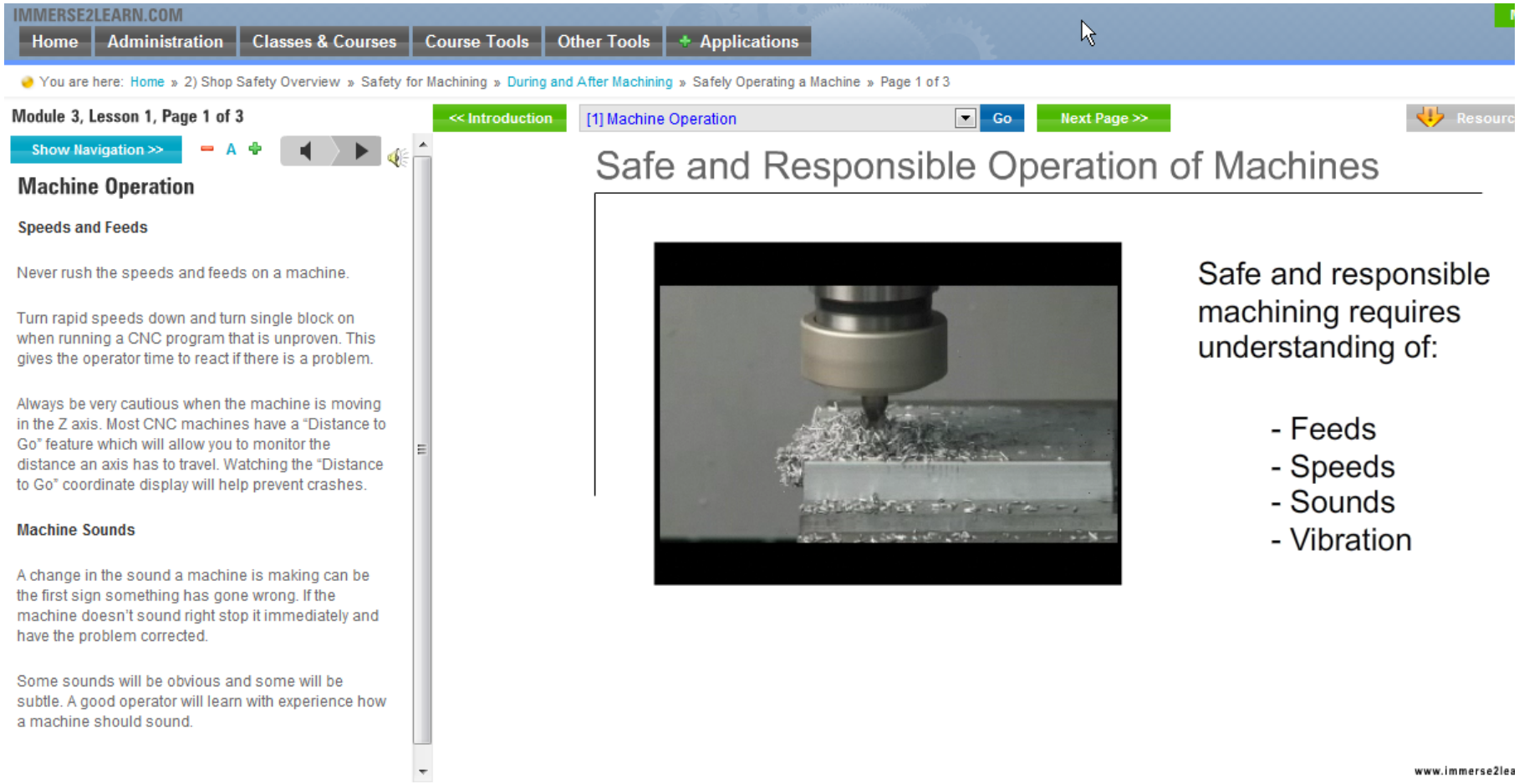
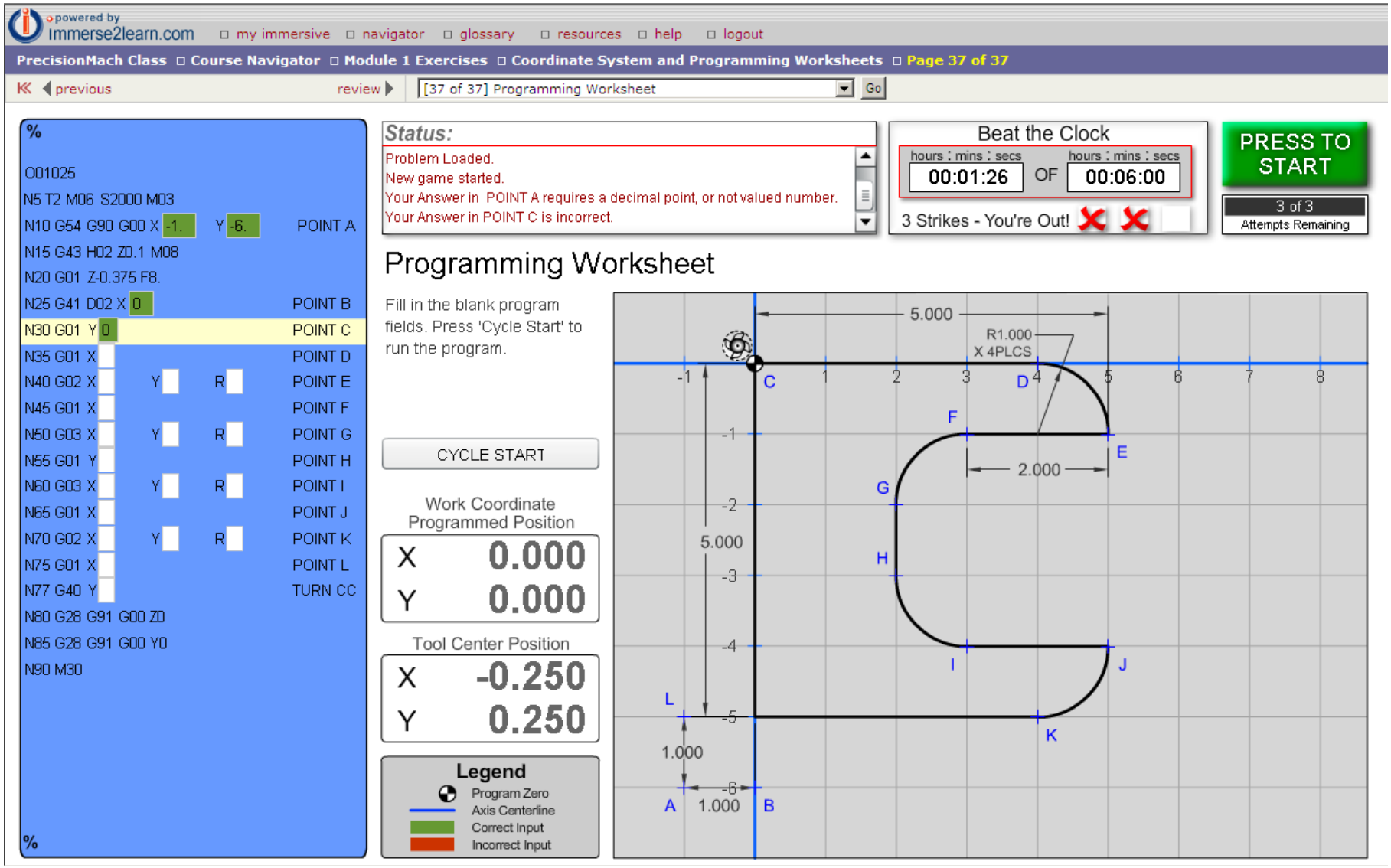
Course Overview

Page Layout



Interactive Exercises

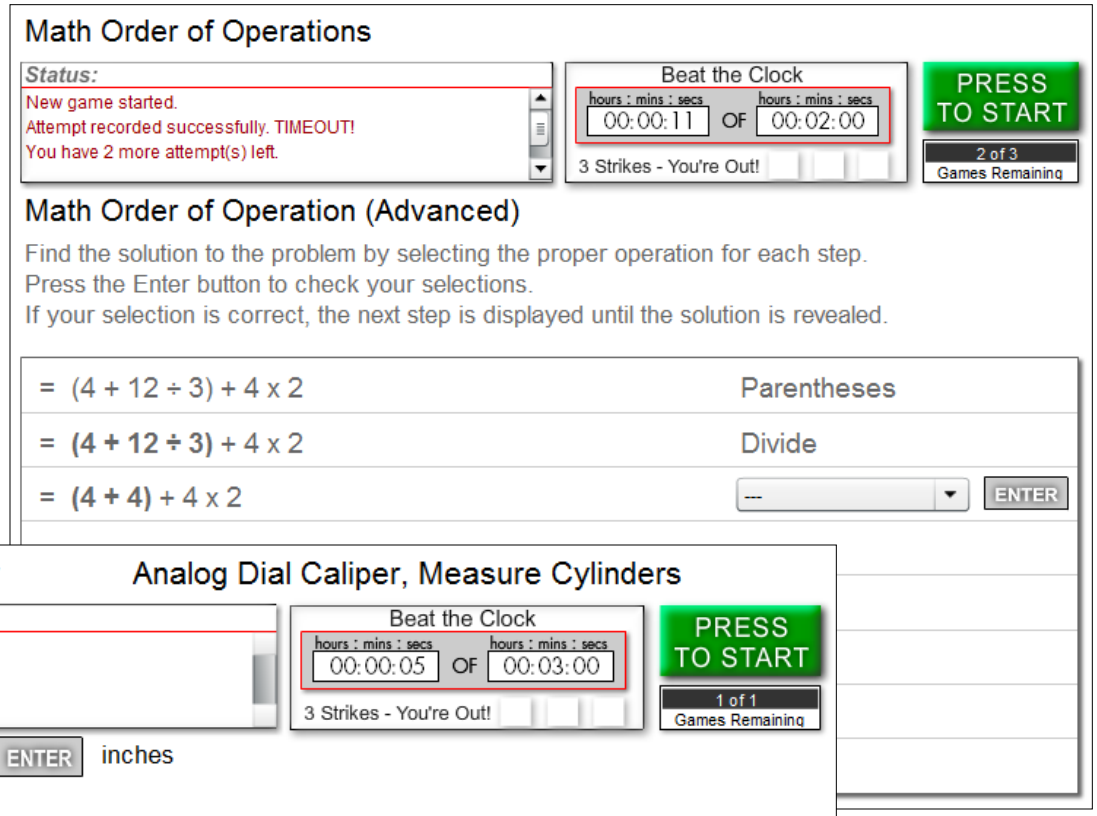
- State-of-the-Art Exercise and Testing Environment

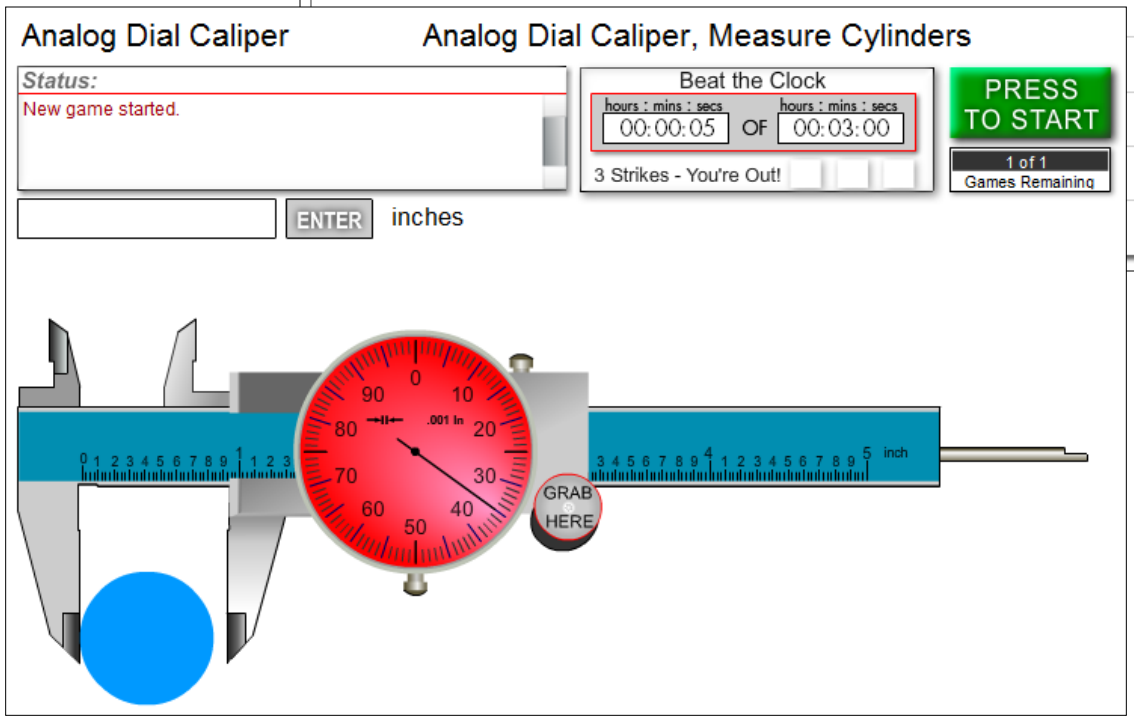


Interactive Exercises

Dynamic Visuals help to accelerate the learning process

- Track learner progress
- Step by step feedback
- Variable time, attempts, and minimum scores





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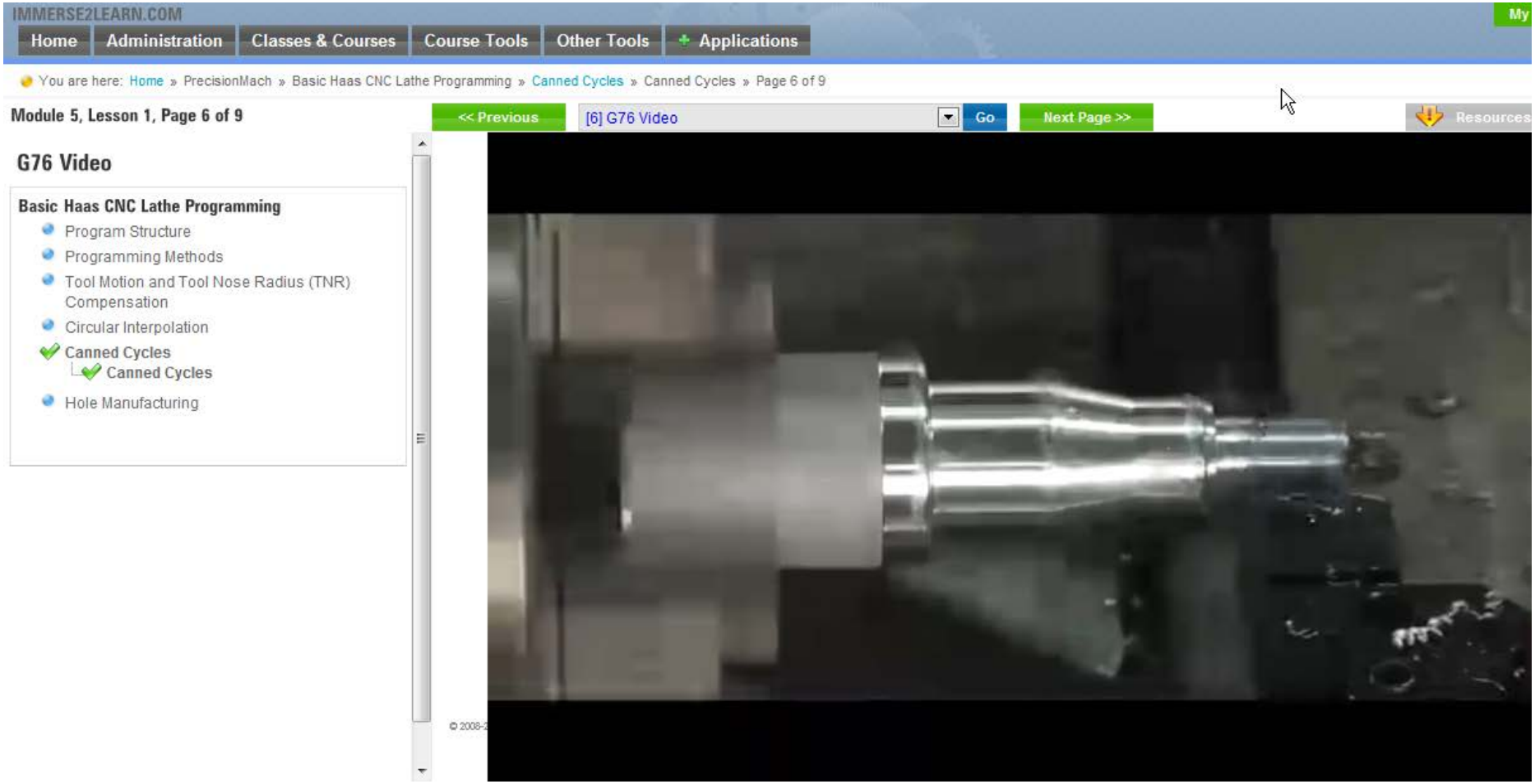
Course Overview

6) Video or graphical instruction and Virtual CNC interaction



Course Overview

Calculated Industries Machinist Calc Pro with Virtual Calculator

IMMERSE2LEARN.COM

Home | Administration | Classes & Courses | Course Tools | Other Tools | + Applications | My Profile

You are here: Home » PrecisionMach » Machinist Calc Pro » Calculate Turning Speeds and Feeds » Turning Speeds and Feeds » Page 18 of 31

Module 3, Lesson 1, Page 18 of 31 | << Previous | [18] Use the MCP Calculator to Calculate Cutting Feed | Go | Next Page >> | Resources

Show Navigation >> | A

Use the MCP Calculator to Calculate Cutting Feed Rate to the High Limit

This example demonstrates how to use the MCP calculator to calculate the Feed Rate to the high limit.

USE EMULATOR

+ Applications

Machinist Calc Pro

1. Enter the Feed Rate (IPM)

   3 1 Feed Rate

2. Enter the Spindle Speed (RPM)

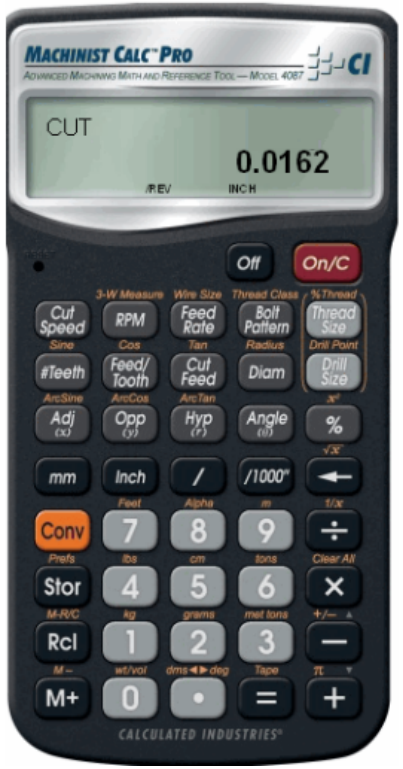
   1 9 1 0 RPM

3. Calculate the Cutting Feed:

   Cut Feed

Tool Manufacturer Cutting Data

Component	Cylindrical Bar 4.0"DIA
Operation	OD Turning
Material	Aluminum
Cutting Speed/SFM	800 - 2000
IPM (f)	1.5 - 31.0



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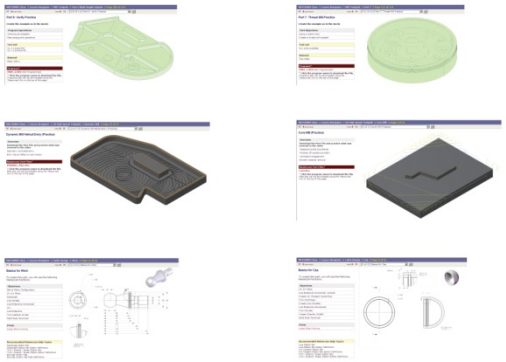
Teaching Concept to Creation

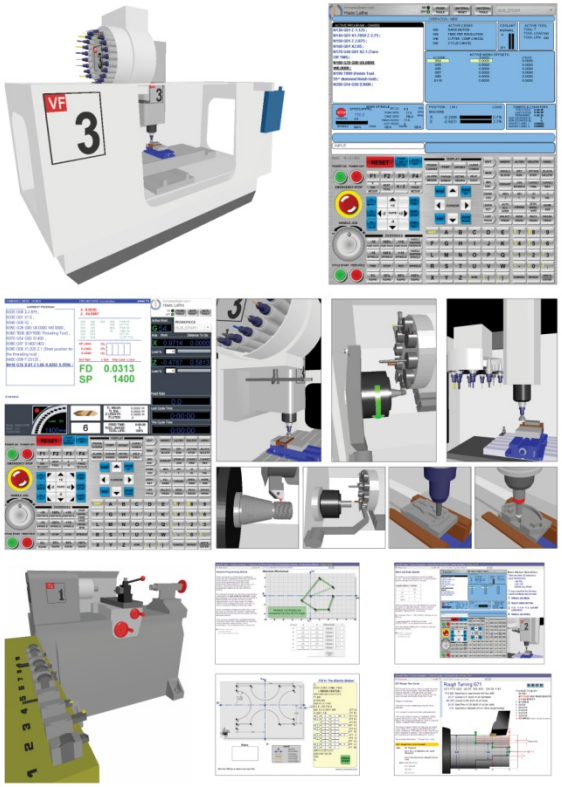
LearnCAM

Mastercam Training and Certification



LearnCNC

Virtual CNC, Interactive Learning and Assessment



Advanced Manufacturing

eXpert TECH

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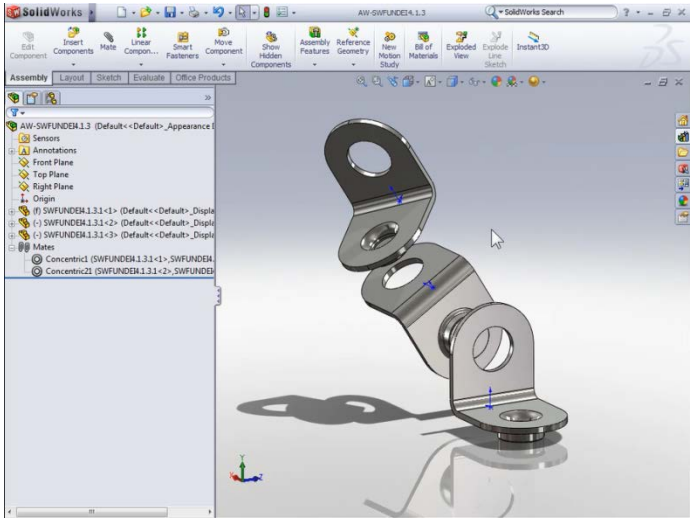
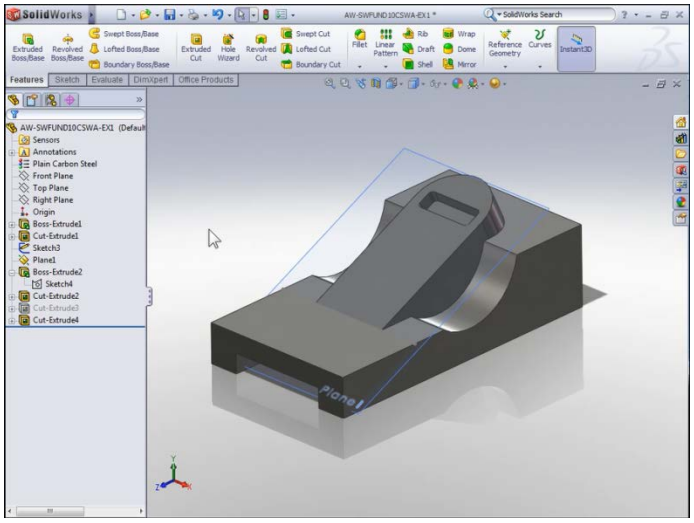
Other Relevant Content

LearnCAD for Solidworks





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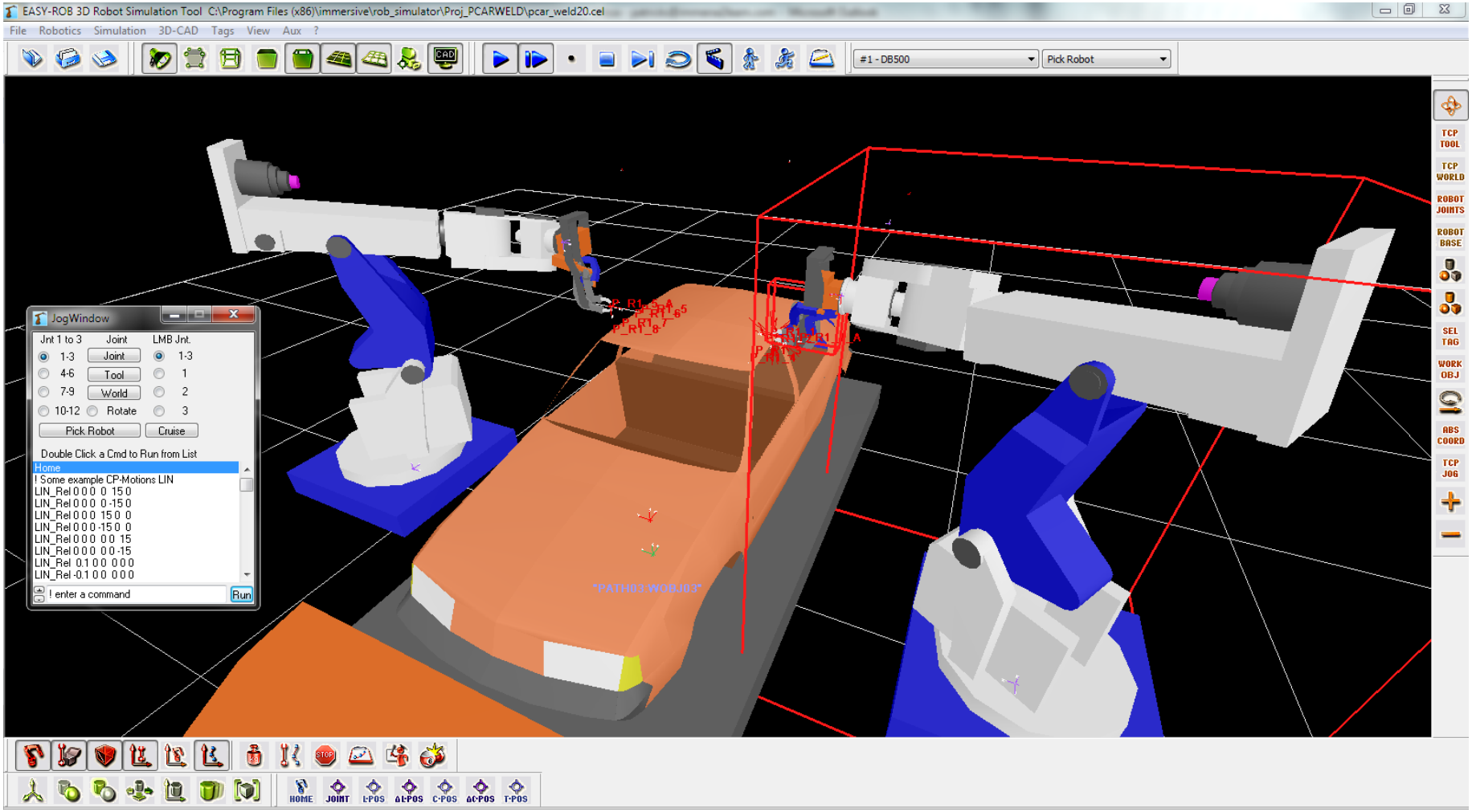
Other Relevant Content

LearnRobotics



Mastercam Certification Curriculum

- X7 and future release Support
- Mill Design and Toolpaths
- Advanced Mill Design and Toolpaths
- Lathe
- **FREE New Home Learning Edition included with curriculum**

Mastercam Certification Curriculum

Mastercam Certification provides: learning pages, video, prints and helpful tips

my immersive | navigator | glossary

MSTCAM Class | Course Navigator | 2D Geometry | Part 1 | Page 4 of

previous | next | [4 of 16] Part 1 Dem

Part 1 Demonstration

Objectives
Circle Center Point (radius)
Line Endpoints (angle)
Circle Center (edge)
Trim (three entity)
Translate (rotate)
Line Endpoints (horizontal, vertical)
Line Endpoints Transform (translate join)
Line Endpoints (midpoint arc)
Trim (three entity)
Translate (copy), Create Circle Center
Circle Center (lock radius)
Fillet (trim quadrants)
Line Endpoints (tangent)
Trim (extend)

Watch the video and learn how.

Videos
Example Video

Prints
Large Drawing

Recommended Mastercam Help Topics

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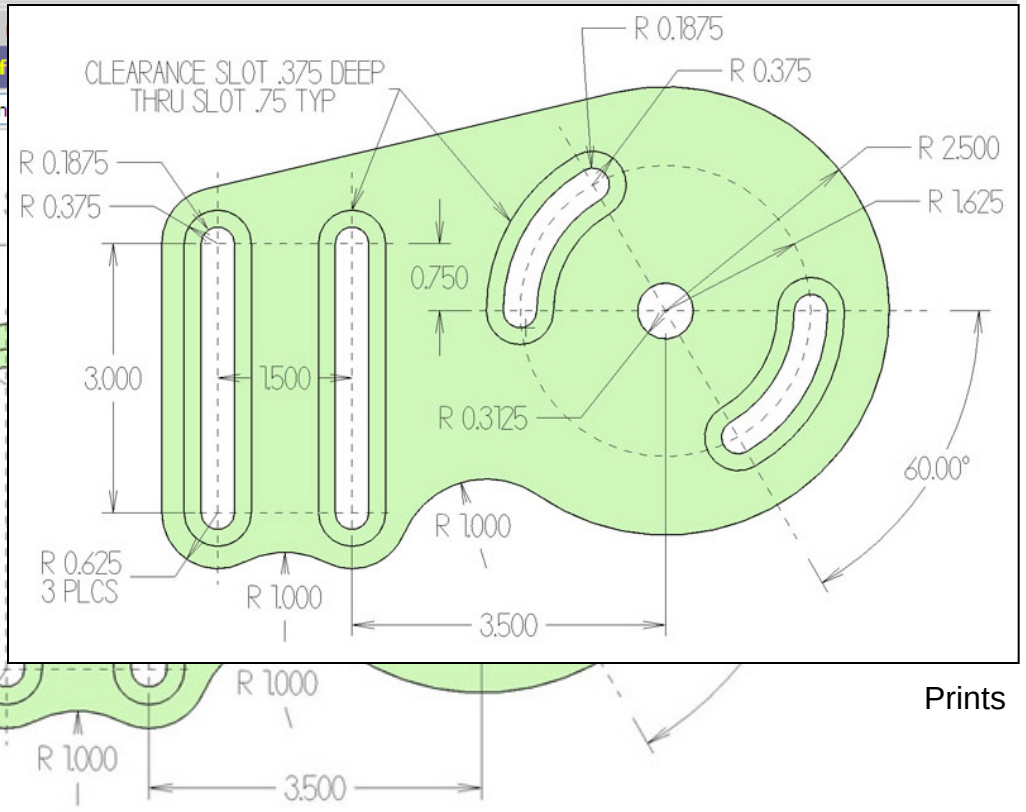


Prints

Learning pages with embedded video

Recommended Mastercam Help Topics
Sketcher
AutoCursor Overview
General Selection Ribbon Bar
General Selection Button Definitions

Helpful tips

Advanced CNC, Mold and Die

Advanced CNC 200: Milling and Drilling

- Modern CNC machines
- Multi-axis machining
- State of the art cutting tools and holders
- Advanced Milling Formulas
- High-speed and high-efficiency machining

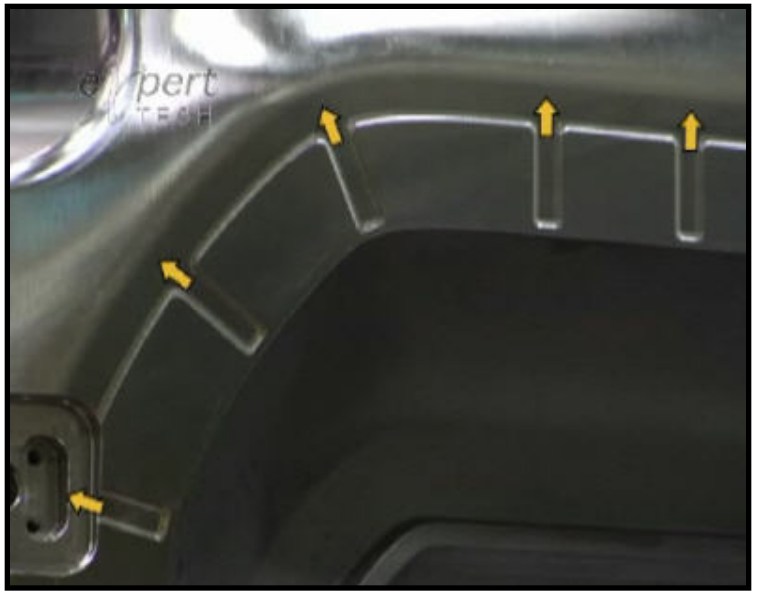
Advanced CNC, Mold and Die

Dies 100: Introduction to Stamping Dies

- Stamping dies and part functions
- Stamping die types and building processes
- Sheet metal cutting and forming

Advanced CNC, Mold and Die

Molds 100: Introduction to Plastic Injection Molds



- Plastic injection molds parts and functions
- Mold building, spotting and machining
- Molding plastics flow concepts

Skills Student Assessment Report

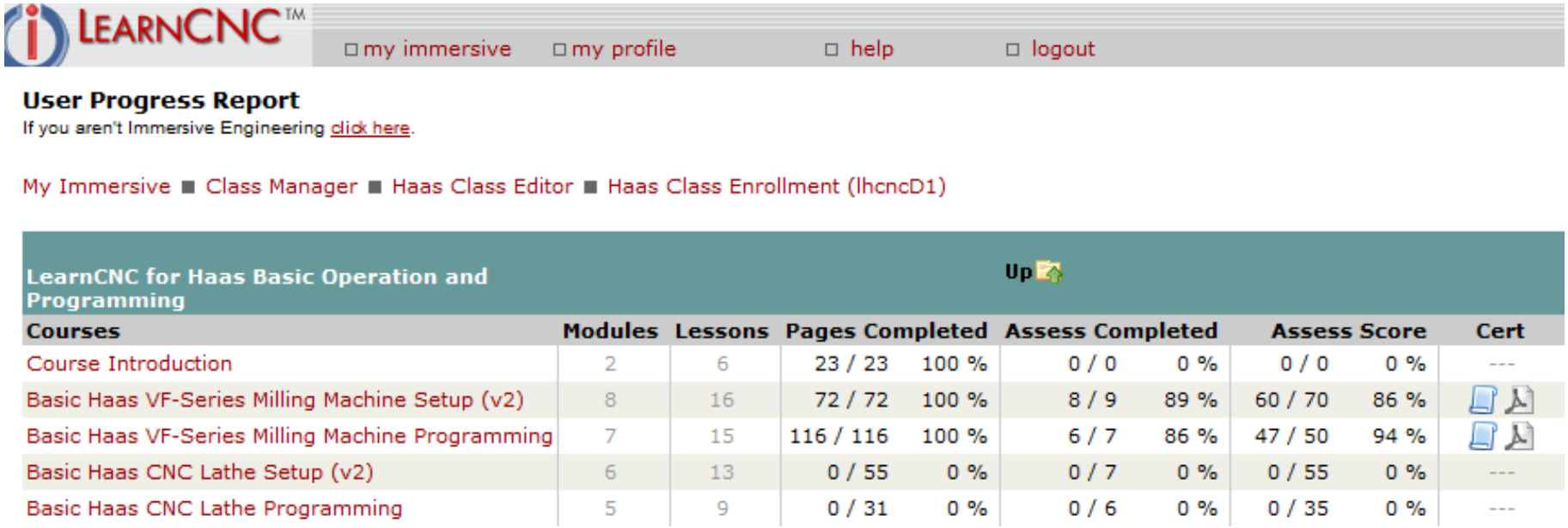
Test Average: 87% **Examination: 85%**

LearnCNC™ for Haas **July 15, 2013 12:30 AM**

Course ID	Test Name	Pre-Test	Score	Tests	Score	Change	Test Result
2010	Machine Motion	Mar 03, 2013 09:59 PM	7 / 10	Mar 03, 2013 10:14 PM	8 / 10	+10%	80%
2010	Mill Control Panel	Mar 03, 2013 10:16 PM	8 / 10	Mar 03, 2013 10:22 PM	8 / 10	+0%	80%
2010	Machine Startup	Mar 03, 2013 10:24 PM	9 / 10	Mar 03, 2013 10:28 PM	9 / 10	+0%	90%
2010	Manual Operations	Mar 03, 2013 10:31 PM	7 / 10	Mar 03, 2013 10:40 PM	6 / 10	--10%	60%
2010	Job Setup	Mar 03, 2013 10:42 PM	6 / 10	Mar 03, 2013 10:53 PM	9 / 10	+30%	90%
2010	Editor	Mar 03, 2013 10:56 PM	8 / 10	Mar 03, 2013 11:03 PM	8 / 10	+0%	80%
2010	Program Entry	Mar 03, 2013 11:04 PM	2 / 5	Mar 03, 2013 11:10 PM	5 / 5	+60%	100%
2010	Program Run	Mar 03, 2013 11:11 PM	5 / 5	Mar 03, 2013 11:14 PM	5 / 5	+0%	100%
2010	**3-Axis CNC Milling Machine Setup (Old Control)**	**Examination**		Mar 03, 2013 11:20 PM	35 / 40		
2310	Machine Motion	Mar 03, 2013 11:24 PM	17 / 20	Mar 03, 2013 11:29 PM	18 / 20	+5%	90%
2310	Mill Control Panel	Mar 03, 2013 11:30 PM	12 / 13	Mar 03, 2013 11:32 PM	13 / 13	+8%	100%
2310	Machine Startup	Mar 03, 2013 11:34 PM	15 / 16	Mar 03, 2013 11:36 PM	14 / 16	--6%	88%
2310	Manual Operations	Mar 03, 2013 11:41 PM	8 / 14	Mar 03, 2013 11:44 PM	9 / 14	+7%	64%
2310	Job Setup	Mar 03, 2013 11:47 PM	9 / 10	Mar 03, 2013 11:48 PM	10 / 10	+10%	100%
2310	Editor	Mar 03, 2013 11:50 PM	14 / 17	Mar 03, 2013 11:51 PM	17 / 17	+18%	100%
2310	Program Entry	Mar 03, 2013 11:52 PM	7 / 9	Mar 03, 2013 11:53 PM	9 / 9	+22%	100%
2310	Program Run	Mar 03, 2013 11:54 PM	6 / 6	Mar 03, 2013 11:55 PM	6 / 6	+0%	100%

Track Student Progress

- Track Progress



Courses	Modules	Lessons	Pages Completed		Assess Completed		Assess Score		Cert
Course Introduction	2	6	23 / 23	100 %	0 / 0	0 %	0 / 0	0 %	---
Basic Haas VF-Series Milling Machine Setup (v2)	8	16	72 / 72	100 %	8 / 9	89 %	60 / 70	86 %	
Basic Haas VF-Series Milling Machine Programming	7	15	116 / 116	100 %	6 / 7	86 %	47 / 50	94 %	
Basic Haas CNC Lathe Setup (v2)	6	13	0 / 55	0 %	0 / 7	0 %	0 / 55	0 %	---
Basic Haas CNC Lathe Programming	5	9	0 / 31	0 %	0 / 6	0 %	0 / 35	0 %	---

Unique Certificate

•Branded to School: Time, date and serial identification

Tennessee Technology Centers

Basic Haas VF-Series Milling Machine Programming

Certificate of Completion

TTC Administrator

has successfully completed the online learning requirements established by:

Office of Tennessee Technology Centers
Tennessee Board of Regents
State University and Community College System of Tennessee

Online learning activities include:

- Interactive Exercises
- Chapter Tests
- Course Examinations
- M & G Code Programming Assignments with the Virtual CNC Emulator and Machines

Chapter Test and Course Examination Scores:

80 %	Editor
80 %	Job Setup
80 %	Machine Motion
100 %	Machine Startup
80 %	Manual Operations
80 %	Mill Control Panel
100 %	Program Entry
100 %	Program Run

Certified By: TTC Administrator
Organization: Tennessee Technology Centers

November 12, 2010
7800-2011-8007-78000000
ETTC7800

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Customer Branded Training System

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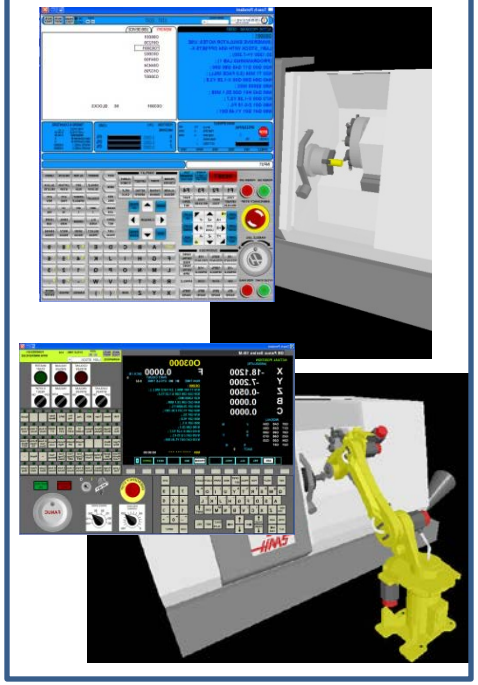
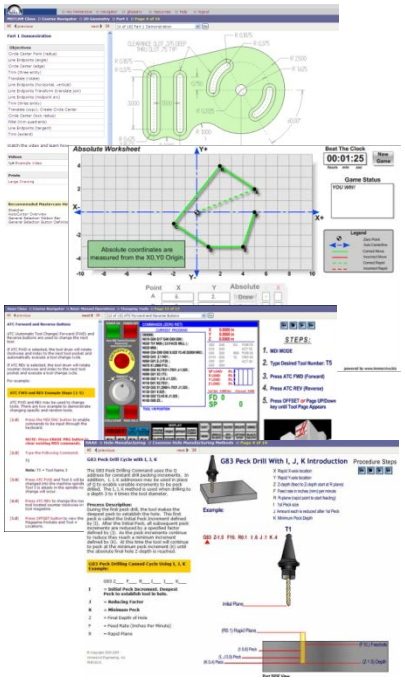
TRAIN

Virtual Training Environment



Skills Learning Modules

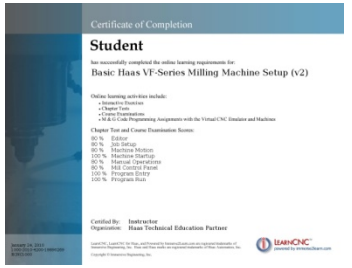


ASSESS

Pre/Post testing, exams, and reports

CERTIFY

Connect to Industry



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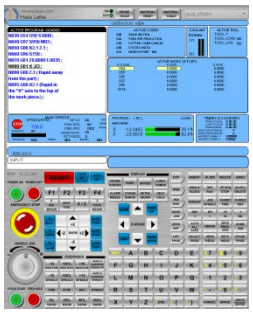
True Virtual Machining Advantage

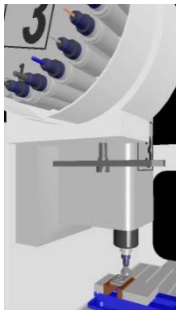
Streamline Process

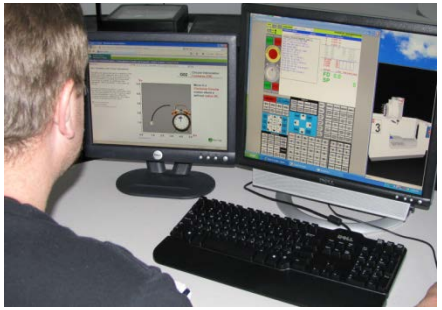
Reduce Bottlenecks

Reduce uncertainty

Learn and Verify
M&G Code Program on PC.



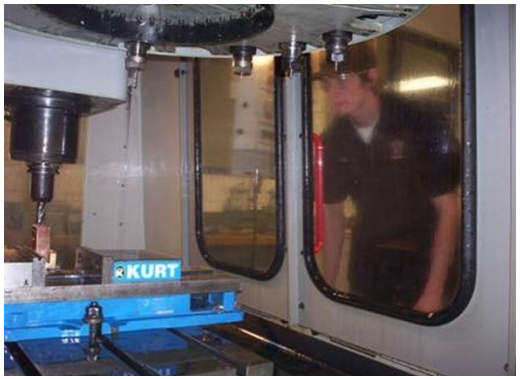




Prove-out to Instructor

Save to
Storage Device

Load on Machine Control



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Going Pro in High School

Brian Aiken

Instructor

Pickens County Career Center

January 2007

- Implemented Virtual Training System
- Prepared Student for Skills Competition without a machine.
- Used system to recruit, retain and train.
- Grew program form 7 to 20 students.
- Expanded curriculum to offer professional development to local mold and die shops.
- Students are recruited by local employers directly from high school
  - 2007- Learn CNC
  - 2011- Advanced CNC, mold and die
  - 2012- Mastercam

https://www.youtube.com/watch?feature=player_detailpage&v=35eURqBlnCk

Go Beyond the Classroom

Mark Bosworth
Industrial Technology Coordinator
Southwestern Illinois College

- January 2009
  Implemented Virtual Training System

- Program grew from
  3 to over 35 students per semester.

- Used in Partnership with 5 high schools and instructors in college's district.

- Serves over 100
  high school students per year.

- Enables high school students to earn 4 SWIC credit hours, free of charge!

- Building deep bench of CNC machining talent to compete in Skills USA competitions.

2011 National Skills USA Winners:
- 3rd place Precision Machining Technology
- 5th place CNC Machining

Using Immersive for NIMS Credentialing

LearnCNC will help Prepare students for the NIMS Credentialing Test

And

The performance Exams

Immerse2learn for NIMS

- Prepares students for NIMS Credentialing Test
- Measurement, Materials & Safety
- Job Planning, Benchwork & Layout
- CNC Turning: Programming Setup & Operations Level I&II
- CNC Milling: Programming Setup & Operations Level I&II
- CNC Lathe Operator
- CNC Mill Operator

NIMS Credential

- Materials, Measurement, and Safety

LearnCNC

Safety for Machining
Shop Mathematics Level I
Shop Mathematics Level II
Reading Manufacturing Blueprints
Precision Measurement
Speeds and Feeds

NIMS Credential

CNC Lathe Operator

LearnCNC Modules

- CNC Lathe Control (Old and New)
- CNC Lathe Programming
- Shop Mathematics I&II
- Reading Manufacturing Blueprints
- Speeds and Feeds
- Precision Measurement

NIMS Credential

CNC Mill Operator

LearnCNC Modules

- CNC Mill Control (Old and New)
- CNC Mill Programming
- Shop Mathematics I&II
- Reading Manufacturing Blueprints
- Speeds and Feeds
- Precision Measurement

NIMS Credential

- Job Planning, Benchwork, & Layout

LearnCNC

Safety for Machining
Shop Mathematics Level I
Shop Mathematics Level II
Reading Manufacturing Blueprints
Precision Measurement
Speeds and Feeds

NIMS Credential

CNC Lathe Programming and Setup

Levels I&II

LearnCNC Modules

CNC Lathe Control (Old and New)
CNC Lathe Programming
Shop Mathematics I&II
Reading Manufacturing Blueprints
Speeds and Feeds
Precision Measurement

NIMS Credential

CNC Mill Programming and Setup
Levels I&II

LearnCNC Modules

CNC Mill Control (Old and New)
CNC Mill Programming
Shop Mathematics I&II
Reading Manufacturing Blueprints
Speeds and Feeds
Precision Measurement