



# SOLIDS TRAINING TUTORIAL

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#### Mastercam 2020 Solids Tutorial

Copyright: 1998 - 2019 In-House Solutions Inc. All rights reserved

Software: Mastercam 2020

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ISBN: 978-1-77146-836-7

Date: July 15, 2019

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# **Solids Projects**

Tutorial	Geometry Functions
#1	Create Rectangle. Chamfer Outside Profile. Solid Extrude Create Body. Solid Extrude Add Boss. Solid Hole. Constant Radius Fillet. One Distance Chamfer.
#2	Create Geometry in Front Plane. Create Rectangle. Create Parallel Lines. Create Tangent Arcs. Create Lines. Translate Geometry. Create Fillets. Solid Revolve Create Body. Solid Extrude Cut Body.
#3	Create Rectangle. Create Geometry in Front Plane. Create Fillets. Create Circle Center Point. Create Rectangular Array. Solid Extrude Create Body. Solid Extrude Add Bosses. Constant Fillet Radius. Solid Sweep Cut Body. Make Changes to The Solid.
	Solid Shell.



Tutorial	Geometry Functions
#4	
	Create Circles Primitive Solid Block Constant Fillet Radius Set Solid Feature Color Solid Extrude Boolean Add Boolean Remove
μг	Create Ellipses
#5	Create Rectangles.
	Create an Arc in Front Plane.
	Create Lines.
	Create Solid Body Using Loft.
	Solid Loft Cut.
	Solid Extrude Cut.
	Move Solid to Another Level.
	Fillet All Edges.
	Set Feature Color.
	Top Construction Plane.
	Create Circle Center Point.
	Create Rectangle.
	Create Horizontal and Parallel Lines.
#6	Create Arc Tangent.
	Create Arc Endpoints.
	Create Fillet.
	Transform Mirror The Geometry.
	Trim Goometry
TC-14	Create Pectangular Shapes
	Create Letters
	Transform Dynamic
	Solid Extrude Create Body.
	Solid Extrude Add Bosses.
	Solid Extrude Add Bosses with Draft Angle.
	Solid Extrude Cut Body.
	Remove Solid History.



Tutorial	Geometry Functions
	Create Rectangle.
	Create Circle Center Point.
#7	Create Arc Polar.
	Transform Rotate.
	Create Line Parallel.
	Create Points.
	Create a Spline.
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	Create Ruled Surface.
	Solids from Surfaces.
	Solid Extrude.
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40	Open File From Previously Saved File. Create
#8	Rectangle.
	Extrude Solid Body.
	Boolean Remove.
	Trim Solid by Plane.
	Transform Dynamic.
#9	
	Open an existing file.
	Model Prep Remove All Solid History Operations.
	Model Prep Split Solid Face - Projection option.
	Nodel Prep Pull-Push.
	Model Prep Move.
	woder Prep Split Solid Face - Flowline option.



# Tutorial 1





#### OVERVIEW OF STEPS TAKEN TO CREATE THE PART GEOMETRY

#### From Drawing to CAD Model:

- The student should examine the drawing on the following page to understand what part is being created in the tutorial.
- From the drawing we can decide how to create the geometry in Mastercam.

#### Create the wireframe that will be used to create the solid:

- The student will create flat geometry in the Top plane.
- Geometry with a Z-Depth of 0 will be created and used to extrude the solid later on.
- 2D Geometry commands such as Rectangle, Chamfer, Trim, and Divide will be used.

#### Create the solid model:

- The student will create a new level to separate the wireframe from the solid model so that the file can be better organized.
- The Extrude command will be used to create the main solid body of the part and the boss.
- The Hole command will be used to cut the holes through the part.
- The Extrude command will be used to add the boss at the top of the main solid.
- The top of the boss will be chamfered using One Distance Chamfer command.



This tutorial takes approximately one hour to complete.



#### **TUTORIAL #1 DRAWING**



#### STEP 1: SETTING UP THE GRAPHICAL USER INTERFACE

Please refer to the Getting Started section for more info on how to set up the graphical user interface. In this step, you will learn how to hide the manager panels to gain more space in the graphics window.

• Use Auto Hide icon to hide all Manager panels.



• The panels will be hidden to the left of the graphics window as shown.

Toolpaths	
Solids	
Planes	
Levels	
Recent Functions	

Note: To un-hide them temporarily, you can click on one of the Managers to open it as shown.



While creating the geometry, keep the Manager panels hidden. This ensures more space in the graphics window for the geometry.



#### STEP 2: SET THE CONSTRUCTION PLANE AND CHANGE WIREFRAME COLOR

In this step you will learn how to set the Construction Plane to create the flat geometry. By setting the Graphic View to Top the Construction Plane will be automatically set to Top too.

• Right mouse click in the graphics window and select the Top (WCS) icon as shown.

Q	Zoom Window
₽	Unzoom 80%
$\bigtriangledown$	Dynamic Rotation
5-0	Fit
(	Top (WCS)
	Top (WCS) Front (WCS)

Isometric (WCS)

#### Note: You may skip this step if the wireframe color is already set to Blue #9.

 Right mouse click in the graphics window and from the Mini Toolbar, left click on the arrow next to the Wireframe Color icon and select the color Blue #9 as shown.





#### STEP 3: CREATE RECTANGLES GIVEN THE SIZE AND ANCHOR POINT

In this step you will learn how to create two rectangles given the width, height, and anchor point.

#### Step Preview:



#### 3.1 Create the 8.0" X 4.0" Rectangle

#### Wireframe

• From the **Shapes** group, select **Rectangle**.

File	Home	Wireframe Surfaces So	olids Model Prep Drafting	Transform	Machine	View	Foolpaths	
Point Position •	+ Bolt Circle	+ Line Parallel + Line Perpendicular Line Closest +	Circle Center Point Circle Edge Point *	Spline Manual *	Rectangle *	Bounding Box	Silhouette Boundary	Turn Relief Groove Door Geometry
Poir	its	Lines	Arcs	Splines			Shap	es

• In the **Rectangle** panel, enter the **Width** and **Height** and enable **Anchor to center** as shown.

Rectangle	Ψ ×
2	S 🛇 😢
Basic	
Points       1     2	۲
Dimensions	۲
Width: 8.0	- ‡ 🔒
Height: 4.0	<b>-</b> ‡ 🔒
Settings	۲
✓ Anchor to center □ Create surface	

**Anchor to center** sets the base point of the rectangle to its center and draws the rectangle outward from the center.

**Create surface** creates a surface inside of the rectangle. Surface creation and Surface toolpath are covered in Mill Advanced.

A **surface** can be described as the skin on the top of a 3D wireframe. If the Create surface option is on, in addition to the four lines of the rectangle, you will also see extra lines which represent the surface display while it is not shaded.



<u>7</u>22

- Press Enter after typing the values to see a preview of the rectangle.
- [Select position of base point]: Select the Origin as shown.



Make sure that when selecting the origin, the visual cue of the cursor changes as <u>shown</u>.



• To fit the drawing to the screen, press **Alt + F1**.

Note: While creating geometry for this tutorial, if you make a mistake, you can undo the last step using the **Undo** icon. You can undo as many steps as needed. If you delete or undo a step by mistake, just use the **Redo** icon. To delete unwanted geometry, select the geometry first and then press **Delete** from the keyboard. To zoom or un-zoom, move the cursor in the center of the geometry and scroll up or down the mouse wheel.

• To zoom in and out, hover the cursor approximately above the center of the part and scroll the mouse wheel up and down.

3.2 Create the 5.0" X 1.25" Rectangle

- Enter the **Width**, the **Height** and leave **Anchor to center** enabled as shown.
- Make sure that the **Create surface** button is not selected.





• [Select position of base point]: Select the **Origin** as shown.



Select the OK button to exit the same command.



• The drawing should look as shown below.



#### **STEP 4: CREATE THE PARALLEL LINES**

In this step you will learn how to create parallel lines to existing lines given the distance between the lines. We are creating the lines to use them as part of the geometry as well as construction lines.

#### Step Preview:



#### Wireframe

• From the Lines group, select Line Parallel as shown.

File	Home	Wireframe Surfaces Su	olids Model Prep Drafting	Transform	Machine View	w Toolpaths	
Point Position *	+ Bolt Circle	+ Line Parallel + Line Perpendicular Line Endpoints 1/2 Line Closest *	Circle Center Point <sup>t</sup> → Arc 3 Points Arc Tangent Center Point <sup>t</sup> → Circle Edge Point *	Spline Manual *	Rectangle Create Bo	ounding Silhouette Box Boundary	Turn Relief Profile Groove 🗊 Door Geometry
Poir	nts	Lines	Arcs	Splines		Shap	25

• [Select a line]: Select Entity A as shown.





• [Select the point to place a parallel line through]: Select a point to the right of the selected line.



• In the Line Parallel panel, enter an Offset Distance of 1.0" as shown.

Line Parallel	Ψ ×
2	<b>S S</b>
Basic	
Entity	٢
Method: <ul> <li>Point</li> <li>Tangent</li> </ul>	
Offset Distance	۲
1.0000	- ‡ 🔒
Direction	۲
Selected side	
Opposite side	
○ Both sides	

- Select the OK and Create New Operation button to stay within the command.
- [Select a line]: Select Entity A again.
- [Select the point to place a parallel line through]: Select a point to the right of the selected line.
- In the Line Parallel panel, enter an Offset Distance of 7.0" as shown.

Line Parallel	Ф ×
2	S S 2
Basic	
Entity	۲
Method:  Point  Tangent	
Offset Distance 7.0000	<ul> <li>• • • •</li> </ul>
Direction	۲
<ul> <li>Selected side</li> <li>Opposite side</li> <li>Both sides</li> </ul>	

• Select the **OK and Create New Operation** button to stay within the command.





• [Select a line]: Select Entity B as shown.



- [Select the point to place a parallel line through]: Select a point above the selected line.
- In the Line Parallel panel, enter an Offset Distance of 1.0" as shown.

Line Parallel	Ф ×
3	S S 3
Basic	
Entity	۲
Method:  Point  Tangent	
Offset Distance	۲
(1.0000	- ‡ 🔒
Direction	۲
Selected side	
<ul> <li>Opposite side</li> <li>Both sides</li> </ul>	

Select the OK and Create New Operation button to stay within the command.



- [Select a line]: Select Entity B again.
- [Select the point to place a parallel line through]: Select a point above the selected line.
- In the Line Parallel panel, enter an Offset Distance of 3.0" as shown.

Line Parallel	Ψ×
Basic	☞ ⊘ 😢
Entity	۲
Method:  Point  O Tangent	
Offset Distance	٢
3.0000	- ‡ 🔒
Direction	٢
<ul> <li>Selected side</li> </ul>	
Opposite side	
⊖ Both sides	



Select the OK button to exit the command. • The geometry should look as shown.





#### **STEP 5: TRIM THE GEOMETRY**

To Trim 1 entity, select the entity you wish to trim, then select the entity you wish to trim to.

#### Step Preview:



#### Wireframe

• From the **Modify** group, select the **Trim to Entities** icon as shown.



• In the Trim to Entities panel, enable the Trim 1 entity as shown.



- [Select the entity to trim/extend]: Select Entity A as shown.
- [Select the entity to trim/extend to]: Select Entity B as shown.
- [Select the entity to trim/extend]: Select Entity A as shown.
- [Select the entity to trim/extend to]: Select Entity C as shown.



- [Select the entity to trim/extend]: Select Entity D as shown.
- [Select the entity to trim to]: Select Entity B as shown.
- [Select the entity to trim/extend]: Select Entity D as shown.
- [Select the entity to trim to]: Select Entity C as shown.
- Select the **OK** icon to exit the command.
- The drawing will appear as shown.





#### STEP 6: REMOVE THE LEFTOVER LINES USING DIVIDE COMMAND

Step Preview:



• From the **Modify** group, select the **Divide** icon as shown.

Wireframe Surfaces So	olids Model Prep Drafting	Transform	Machine View	Toolpaths			$\frown$
↓ Line Perpendicular Line Closest *	Circle Center Point ℃ Circle Edge Point *	Spline Manual *	Rectangle Create Bound * Letters Bound	ting Silhouette Turn Relief soundary Profile Groove	Raster to Vector           Stair Geometry           Door Geometry	Curve Curve All Curve One Edge Edges Slice *	Trim to Entities * Pieces * Modify Length
Lines	Arcs	Splines		Shapes		Curves	

• In the **Divide** panel, make sure that **Trim** is enabled as shown.



• Select the lines as shown.



• The geometry will appear as shown.



• Select the **OK** button to finish the command.





#### **STEP 7: CHAMFER THE INSIDE RECTANGLE**

In this step we will use the Chamfer Entities command to apply chamfers to the corners of the outside profile.

#### Step Preview:



#### Wireframe

• From the **Modify** group, select **Chamfer Entities**.

Wireframe Surfaces S	olids Model Prep Drafting	Transform	Machine View	Toolpaths				
+ Line Perpendicular Endpoints ∽ Line Closest *	Circle Center Point Circle Edge Point *	Spline Manual *	Rectangle Create Bound	ing Silhouette Boundary F	Turn Relief Profile Groove	Curve Curve All Curve One Edge Edges Slice	Trim to Break Two Entities * Pieces *	oin Entities Modify Length Entities * Entities *
Lines	Arcs	Splines		Shapes	i	Curves		Modify



- Select **1 Distance** and enable **Trim entities** in the panel as shown.
- Enter a distance of **0.25** as shown.

Chamfer Entities	<b></b>
Basic	Solution
Entity Method:  1 Distance 2 Distances Distance and angle Width	۲
Distance 1 0.2500 Distance 2	<ul> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>
Angle 45.0000	<ul> <li>•</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>
Width 0.2500 Settings	ی ج ج ۵
Trim entities	

- [Select line or arc]: Select Entity A as shown.
- [Select line or arc]: Select Entity B as shown.





- [Select line or arc]: Select Entity B as shown.
- [Select line or arc]: Select Entity C as shown.



- [Select line or arc]: Select Entity C as shown.
- [Select line or arc]: Select Entity D as shown.



- [Select line or arc]: Select Entity D as shown.
- [Select line or arc]: Select Entity A as shown.



• Select the **OK** button to exit the command.



• The geometry should look as shown.



#### **STEP 8: SAVE THE FILE**

File

- Save As.
- Click on the **Browse** icon as shown.
- Find a location on the computer to save your file.
- File name: "Wireframe 1".
- Click Save

Browse



#### Solid Creation

A **Solid** is a geometric entity that occupies a region of space and consists of one or more faces, which define the closed boundary of the solid. A solid operation requires closed boundary geometry.

#### STEP 9: CHANGE THE SOLID COLOR TO RED

 Right mouse click in the graphics window and from the Mini Toolbar, left click on the arrow next to the Solid Color icon and select the color red as shown.



#### STEP 10: CHANGE THE MAIN LEVEL TO 2

**Levels** are a primary organizational tool in Mastercam. A Mastercam file can contain separate levels for wireframe, surfaces, drafting entities, solids, and toolpaths. By organizing your files into levels, you can easily control which areas of the drawing are visible at any time and which parts are selectable. By doing so, you will not inadvertently make changes to areas of the drawing you do not want to change.

In this step we will change the Main Level to 2 to create the solid on Level 2.

• Right mouse click in the graphics area and in the **Mini Toolbar**, change the **Level** number to **2** as shown.

* -	_	-		<b>B</b>	- 😐	<b>•</b> 🗉	-
🗮 🍡 🌬 3D	Ζ	0.0	🧐	2	$\supset$	-	3

• Press the **Enter** key on your keyboard.



# In-House Solutions Nastercam, 2020

TRAINING SOLUTIONS

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# TRAINING TUTORIALS

Our popular line of Mastercam Training Tutorials cover every Mastercam application, offering the most extensive collection of Mastercam training solutions available. Each book contains a series of tutorials that guide you through creating geometry, applying then verifying toolpaths and generating G-Code. Helpful hints, review exercises and quizzes complete the learning experience.



The Home Learning Edition (HLE) Demo Software is available for download with each eBook, and can be purchased on DVD for \$5.

# ARE YOU AN INSTRUCTOR?

Buy 10 or more of the Mill Essentials, Mill Advanced or Lathe Training Tutorials, get the corresponding Instructor Guide for Free! (see page 5)





The Mill Essentials Training Tutorial takes a very comprehensive look at 2D machining with Mastercam.

This book begins with the absolute basics by introducing the Mastercam user interface and will have you creating geometry, mastering 2D toolpaths and posting code before you know it.

- 7 Step-by-Step Tutorials with Review Exercises
- Includes Video Training DVD and Mastercam HLE Demo Software

Price \$65 (eBook) ISBN: 978-1-77146-870-1 Price \$90 (Print) ISBN: 978-1-77146-833-6



The Lathe Training Tutorial is ideal for both beginners and current Mastercam users.

This book introduces 2D geometry creation and lathe 2D toolpaths providing an excellent foundation for many lathe applications.

- 7 Step-by-Step Tutorials with Review Exercises
- Includes Video Training DVD and Mastercam HLE Demo Software

Price \$45 (eBook) ISBN: 978-1-77146-872-5 Prico \$65 (Drint)

Price \$65 (Print) ISBN: 978-1-77146-835-0



The Mill Advanced Training Tutorial picks up where Mill Essentials leaves off, introducing 3D concepts including surface high speed toolpaths.

It is strongly recommended that you have a good understanding of 2D machining before beginning this book.

- 6 Step-by-Step Tutorials with Review Exercises
- Includes Video Training DVD and Mastercam HLE Demo Software

Price \$60 (eBook) ISBN: 978-1-77146-871-8 Price \$80 (Print) ISBN: 978-1-77146-834-3



#### Lathe C & Y Axis

The Mastercam 2020 Lathe C & Y Axis Training Tutorial is intended for the advanced lathe user that wants to learn how to program lathe parts that include milling operations.

Advanced C-Axis toolpaths as well as the Y-Axis rotation will be described in this book. Examples on how to use the Mill toolpaths on a Lathe with Live Tooling are also incorporated.

Price \$65 (eBook) ISBN: 978-1-77146-887-9 Price \$85 (Print) ISBN: 978-1-77146-848-0



The Multiaxis Essentials Training Tutorial is intended for the advanced Mastercam user looking to learn Mastercam multiaxis programming.

A firm grasp on both 2D and 3D machining is required which can be attained by completing the Mill Essentials and Mill Advanced Training Tutorials.

- 10 Step-by-Step Tutorials
- Includes Video Training DVD and Mastercam HLE Demo Software

Price \$85 (eBook) ISBN: 978-1-77146-878-7 Price \$90 (Print) ISBN: 978-1-77146-841-1



The Solids Training Tutorial provides concise step-by-step instructions on creating and manipulating 3D wireframe and solid geometry.

This book details commands such as extrude, loft, revolve, sweep, boolean add, fillet, chamfer and more.

- 9 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$40 (eBook) ISBN: 978-1-77146-873-2 Price \$60 (Print) ISBN: 978-1-77146-836-7



The Multiaxis Advanced Training Tutorial is intended for the advanced Mastercam user.

This book contains projects demonstrating a variety of Multiaxis Advanced milling applications such as pattern application toolpaths.

- 6 Step-by-Step Tutorials
- Includes Mastercam HLE Demo Software

Price \$75 (eBook) ISBN: 978-1-77146-879-4 Price \$80 (Print) ISBN: 978-1-77146-842-8



The Mastercam 2020 for SOLIDWORKS Programming Exercises book provides a comprehensive "hands on" method of learning Mastercam for SOLIDWORKS. You will learn how to program a variety of different parts that require most of the toolpath types available in Mastercam for SOLIDWORKS. Extensive emphasis is put on making parametric changes and toolpath updates to match the SOLIDWORKS model changes. Primary focus is on toolpath creation on SOLIDWORKS models.

Price \$65 (eBook) ISBN: 978-1-77146-881-7 Price \$85 (Print) ISBN: 978-1-77146-844-2



The Router Training Tutorial offers detailed coverage of 2D geometry creation, drilling, contouring, pocketing, nesting, block drilling and importing graphics to machine.

Instruction on tool settings, stock setup and custom profile tool creation are also included.

- 8 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$65 (eBook) ISBN: 978-1-77146-876-3

Price \$85 (Print) ISBN: 978-1-77146-839-8



The CAD Import & Mill Essentials Toolpaths Training Tutorial is intended for anyone looking to understand the ins and outs of Mastercam Mill Essentials toolpaths, while learning the best practices for importing geometry from various CAD software packages.

- 7 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$70 (eBook) ISBN: 978-1-77146-878-7

Price \$90 (Print) ISBN: 978-1-77146-846-6



The Beginner Training Tutorial provides a comprehensive step-by-step approach to learning the basics of three Mastercam modules: Mill Essentials (2D), Lathe and Solids.

It is an excellent choice for new Mastercam users looking to get a broader overview of the software.

- 8 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$65 (eBook) ISBN: 978-1-77146-874-9 Price \$85 (Print) ISBN: 978-1-77146-837-4



The CAD Import & Mill Advanced Toolpaths Training Tutorial consists of 6 projects and 6 accompanying practice exercises. It is intended for intermediate to experienced Mastercam users who are primarily importing 3D geometry from another CAD software package.

- 6 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$60 (eBook) ISBN: 978-1-77146-884-8 Price \$80 (Print) ISBN: 978-1-77146-847-3



The Design Training Tutorial provides a comprehensive step-by-step approach to learning geometry creation within Mastercam.

Its focus is 2D and 3D geometry creation with explanations given on how to dimension the parts.

- 12 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$45 (eBook) ISBN: 978-1-77146-875-6 Price \$65 (Dist)

Price \$65 (Print) ISBN: 978-1-77146-838-1



The Wire Training Tutorial provides users with an excellent resource for learning how to use Mastercam to program wire EDM machines.

In addition to geometry creation, the book focuses on wirepaths for dies, taper angle projects and more.

- 6 Step-by-Step Tutorials with Review Exercises
- Includes Mastercam HLE Demo Software

Price \$40 (eBook) IBSN: 978-1-77146-877-0 Price \$60 (Print) ISBN: 978-1-77146-840-4



The Mastercam 2020 Project Workbook is ideal for High School students, hobbyists and those who prefer engaging in projectbased learning. The Workbook includes an overview of CAD/CAM and basic machining followed by a series of step-by-step projects for both mills and lathes. *Note: no machining instructions included*.

- Five projects included: Art Lithophane, Bowling Pin, Shield, F1 Car, and Jewelry Box
- Includes Mastercam HLE Demo Software

Price \$60 (eBook) ISBN: 978-1-77146-880-0 Price \$75 (Print) ISBN: 978-1-77146-843-5



This tutorial includes a variety of projects that are using Nesting options in Mastercam to fit parts onto a sheet of material for best yield.

You will learn how Nesting operates on geometry and how you can create and use tabs to assist in holding down the nested parts. You will also learn how Nesting operates on toolpaths and how you can use WCS (Work Coordinate System) to set the parts of an assembly in the proper view for machining.

Price \$35 (eBook only) ISBN: 978-1-77146-885-5

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# **INSTRUCTOR KITS**

These are the ultimate toolkits for instructors looking to enhance their 2D mill, 3D mill and lathe classes while minimizing prep time. Each kit contains tests, quizzes, mid-terms, finals, powerpoint presentations, lesson plans, answer sheets, and more.



Instructor Guide & Training Tutorial are included in each kit. Each print kit includes an Instructor DVD, Video Training DVD, and Mastercam HLE Demo Software. Download links are provided for eBook kits.

Bundle

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\$100 Mill Essentials Kit ISBN: 978-1-77146-864-0 \$100 Mill Advanced Kit

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# NEW!

# MASTERCAM PROFESSIONAL CERTIFICATION CURRICULUM

This 3-part series is designed to help you prepare for your Professional Level Mastercam Certification<sup>™</sup> Test. The skills exam must be administered by a Mastercam Certified Instructor or a Mastercam Certified Reseller.



Part 1 – Mill 2D begins at the absolute basics by introducing the Mastercam user interface. It will have you creating geometry, drilling and creating contour toolpaths before you know it. Its gradual progression leads to more advanced concepts such as multiple setup scenarios and 2D High Speed Toolpaths. All of the parts within the book are designed with machinability in mind.

A multitude of topics are covered including 2D geometry, tool settings, stock setup, drilling, tapping, contouring, pocketing, circle milling. You will learn the 2D High Speed Toolpaths such as dynamic mill, area mill, dynamic rest mill, how to import a solid and machine it and how to use the WCS in multiple fixture applications.

Price \$100 ISBN: 978-1-77146-867-1



Part 2 – Solids will teach a variety of useful solids commands, that include extrude, loft, revolve, sweep, boolean add and remove, fillet, chamfer, shell, trimming, and creating solid patterns. You will learn how to change a solids color and create a solid geometry from surfaces, as well as how to manipulate a solid by using commands from the Model Prep menu such as Push-Pull, Move and Split Solid Face. You will use create Layout and learn how to dimension parts to create blueprints.

Price \$100 ISBN: 978-1-77146-868-8



Part 3 – Advanced Mill 2D is dedicated to the power user. You will learn how to machine an imported solid model using the WCS for multiple setups. To better organize the parts, you will master how to use levels and view sheets. You will practice indexing a 4-axis part using the tool planes defined in the Plane manager. Fixtures will be used and the part will be align to their faces. You will learn how to save operations to a library and how to import them for different parts. A brief introduction to the basic 3D machining will be also covered.



This part 1, 2 & 3 bundle provides you all three Mastercam Professional Certification Curriculum at a better price.

Price \$250 ISBN: 978-1-77146-904-3

Price \$100 ISBN: 978-1-77146-869-5

# HANDBOOKS



#### Handbook Volume 1 Mill 2D & Solids

The Mastercam 2020 Handbook Volume 1 is an excellent resource that teaches the theory of Mastercam Mill and Solids. The material intertwines conceptual subject matter with practical applications suitable for beginners and intermediates alike. You not only learn how to use Mastercam but why things work as they do.

Price \$90 (eBook) ISBN: 978-1-77146-893-0

Price \$98 (Print) ISBN: 978-1-77146-855-8 The Mastercam 2020 Handbooks provide an academic approach to teaching the theory and application of Mastercam. The Handbook series is designed to teach the fundamentals of Mastercam, gradually working up to more complex material with each volume. Each Handbook comes with a Student DVD that contains files referenced within the book, and the Mastercam 2020 HLE Demo Software.



3D Modeling & Machining

The Mastercam 2020 Handbook Volume 2 takes an academic approach to teaching Mastercam 3D modeling and machining. The material is most suitable for intermediates (including individuals that have completed Volume 1). The book teaches more advanced CAD modeling techniques and explains surface creation.

Price \$90 (eBook) ISBN: 978-1-77146-894-7 Price \$98 (Print)

ISBN: 978-1-77146-856-5



Handbook Volume 3 Multiaxis & Machining

The Mastercam 2020 Handbook Volume 3 is an excellent resource that teaches the theory of multiaxis machining with Mastercam. This book covers the classic family of multiaxis toolpaths including drill 5-axis, curve 5-axis, swarf 5-axis, multiaxis flowline and multiaxis multi-surfaces as well as the drill & circle mill family.

Price \$90 (eBook) ISBN: 978-1-77146-895-4 Price \$98 (Print) ISBN: 978-1-77146-857-2

# FREE eBOOKS



#### How-To Tips Collection

The In-House Solutions support specialists take note of the questions that are asked. We realize that if you're asking a question there are ten more people who want to know the answer but haven't asked. Our goal is to make your life easier, so we've collected the answers to your most popular questions here, in one convenient eBook.

Price – FREE! (eBook only)



#### Horizontal Machining with Indexing

The Indexing Training Tutorial explains how to use the Plane Manager for working with tool planes and work offsets.

Examples include horizontal machining using the WCS and a multiple fixtured tombstone project.

Price – FREE! (eBook only)

Download at www.eMastercam.com/freebooks











Expand your Mastercam knowledge, anytime and at your own pace, with our selection of step-by-step online video eCourses.

Mastercam eCourses provide both novice and seasoned Mastercam users with the tools and information they need to excel.

The "log in & learn" format of each eCourse allows users to set up their own online classroom, where each user's experience is customized and tracked. Because the eCourses are not subscription-based and have no expiration date, users can log on and off at any time, and finish the program at their convenience without additional expense.

Approximate completion time ranges from 7.5 to 15 hours depending on the eCourse, making it possible for employees or students to gain new skills outside of work or studies.

# Highlights:

 Online previews with table of contents including the time it takes to complete each session.

Mastercam

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#### Mill Essentials eCourse

The Mill Essentials eCourse introduces students to 2D CAD and milling toolpaths. It covers wireframe and solids creation as well as 2D mill toolpaths such as contour, drilling, blend, peel, dynamic area, transform, Feature Based Drilling, and more. This course serves as an excellent introduction to Mastercam.



#### Mill Advanced eCourse

The Mill Advanced eCourse builds on what students have learned in the Mill Essentials eCourse. It moves into more advanced CAD and demonstrated 3D wireframe, solid, and surface creation commands. 3 axis toolpaths such as Area Roughing, Dynamic OptiRough, Scallop, Pencil, Waterline, Radial, Hybrid, and more are covered.



#### Lathe eCourse

The Mastercam Lathe eCourse covers wireframe creation, working with imported part files, stock setup, facing, roughing, finishing, grooving, drilling, and cutoff toolpaths. Stock operations such as advance, flip, and tailstock are also covered. You will also learn how to program parts in a VTL.



#### Multiaxis Essentials eCourse

The Multiaxis Essentials eCourse covers 4 & 5 axis toolpaths. Toolpaths include contour with axis substitution, drilling with axis substitution, drilling with rotary axis positioning, rotary 4-axis, curve 5-axis, swarf 5-axis, drill 5-axis, circle mill 5-axis, flow 5-axis, and multisurface 5-axis. This course skips most CAD in favor of focusing on toolpaths.

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# PROFESSIONAL COURSEWARE

The Mastercam Professional Courseware titles are intended for industrial training settings. Instead of step-by-step instructions, these books introduce concepts through sequences of specialized training exercises followed by parts the users are expected to produce with minimal guidelines.



The Mastercam 2020 Mill Essentials Professional Courseware provides in-depth coverage of 2D wireframes and solids geometry, as well as contour, pocket, drilling, circle milling and slot milling toolpaths. More advanced exercises explain the use of the Work Coordinate System (WCS), 2D high speed toolpaths, Feature Based Machining (FBM) and more.

Price \$60 (eBook) ISBN: 978-1-77146-896-1 Price \$70 (Print) ISBN: 978-1-77146-858-9





**Professional Courseware** Lathe

The Mastercam 2020 Lathe Professional Courseware offers an in-depth look at Mastercam Lathe geometry and toolpath creation. Advanced toolpaths such as Misc Ops and C-Axis toolpaths are also described. Additional Mastercam files are provided along with guidelines for creating the toolpaths to machine each part.

Price \$55 (eBook) ISBN: 978-1-77146-898-5

Price \$65 (Print) ISBN: 978-1-77146-860-2



Professional Courseware Mill Advanced

The Mastercam 2020 Mill Advanced Professional Courseware covers a multitude of features that teach a user to create 3D wireframes, surfaces and solids for 3D modeling and toolpaths. Interactive training exercises introduce 3D geometry functionality, while newer surface high speed toolpaths are thoroughly investigated along with their various parameter settings.

Price \$50 (eBook) ISBN: 978-1-77146-897-8 Price \$60 (Print) ISBN: 978-1-77146-859-6





Professional Courseware **Multiaxis** 

The Mastercam 2020 Multiaxis Professional Courseware details numerous toolpaths that allow a user to successfully machine 4-axis and 5-axis parts. Multiaxis Advanced toolpaths have been included with more complex parts along with instructions on how to machine them. Machine Simulation is used to check for any collisions between the part, the tool and any of the machine's components.

Price \$65 (eBook) ISBN: 978-1-77146-899-2 Price \$75 (Print) ISBN: 978-1-77146-861-9





# Join the eMastercam community!

eMastercam is one of the largest and oldest online forums for swapping knowledge of CNC machines, tools, manufacturing processes and technology. After hours, eMastercam continues to be a place for Machinists, Engineers and others in the manufacturing industry to connect, share stories, opinions and get to know each other beyond the parts we make and the tools we use.

- Active user forums with an education-specific sub forum
- Free downloads and educational resources
- Free post processors and advanced development requests
- Overviews of Mastercam 2020 and related products
- The place to find our Mastercam Training Solutions

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We appreciate your feedback

Industry insights and much more!

## www.eMastercam.com/forums

#### We don't just educate, we inspire!

# TELL US WHAT YOU THINK

Our goal is to provide you the best Mastercam Training Solutions, and we do that with your help.

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- Let us know what you think can be improved
- Give us suggestions for future products

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