# Mastering Surface Modeling with SOLIDWORKS 2020

Basic through Advanced Techniques



Lani Tran, CSWE

# Visit the following websites to learn more about this book:









# **TABLE OF CONTENTS**

Chapter 1: Intro	duction to Surfaces	1-1
	Solids vs. surfaces	1-1
	Patching with continuity	1-2
	Contact, tangent, and curvature continuous	1-2
	When to use surfaces	1-3
	When not to use surfaces	1-3
	The spline handles	1-4
	Check your surface model frequently	1-5
	The best approach	1-6
Chapter 2: Surfa	acing Basics	2-1
	Extruded surface	2-1
	Creating a curve through reference points	2-2
	Creating the planar surfaces	2-3
	Knitting the surfaces	2-4
	Saving your work	2-4
	Revolved surface	2-5
	Creating a section view	2-6
	Adding fillets	2-6
	Swept surface	2-8
	Sketching the sweep path	2-8
	Creating a swept surface	2-9
	Lofted surface	2-10
	Sketching the 3rd profile	2-10
	Creating a lofted surface	2-11
	Boundary surface	2-13
	Sketching the 3D splines	2-13
	Creating a boundary surface	2-16
Chapter 3: Using	g Boundary and Lofted Surface	3-1
onaptor or com	Starting a new part document	3-1
	Creating the 1st reference plane	3-3
	Sketching the 1st boundary profile	3-3
	Sketching the 2nd boundary profile	3-4
	Comparing methods	3-5
	Creating a boundary surface	3-6

	Creating the 2nd reference plane Constructing the 1st trim sketch Trimming the bottom Constructing a split sketch Creating a spilt line feature Deleting faces Thickening the surface model Adding fillets RealView graphics Ambient occlusion	3-7 3-8 3-9 3-10 3-11 3-12 3-13 3-14 3-15 3-16
	Advanced Surfaces – Surface Trim & Loft Creating a revolved surface Trimming with a sketch Making a surface offset Trimming with another sketch Creating a lofted surface Knitting all surfaces	3-17 3-17 3-18 3-18 3-19 3-20 3-21
Chapter 4: Surfa	Creating the 1st sketch Creating the 2nd sketch Trimming the surfaces Mirroring a surface body Making the loft profiles Creating a lofted surface Making the fill profiles Creating two filled surfaces Creating a planar surface Knitting the surfaces Adding fillets Creating a split line feature Creating a face fillet with hold line Creating more fillets	4-1 4-1 4-2 4-3 4-4 4-5 4-6 4-7 4-8 4-9 4-9 4-10 4-11 4-12 4-13
	Advanced Surfaces – Phone Case Opening a part document Creating a boundary surface Creating the 1 <sup>st</sup> lofted surface Creating the 2 <sup>nd</sup> lofted surface Creating the 3 <sup>rd</sup> lofted surface Hiding the sketches Knitting the surface	4-15 4-15 4-16 4-17 4-18 4-19 4-20

Chapter 5: Using	g Filled, Knit & Boundary Surface	5-1
	Opening a part document	5-1
	Creating a boundary surface	5-2
	Creating a revolved surface	5-3
	Creating a filled surface	5-4
	Knitting the surfaces	5-5
	Creating a split line feature	5-6
	Changing the face color	5-7
	Shelling the model	5-8
	Enabling RealView graphics	5-8
	Advanced Surfaces – Using Deform	5-9
	Creating a lofted surface	5-9
	Creating a deform feature	5-10
	Trimming to the final size	5-11
	Patching the bottom surface	5-12
	Knitting the surfaces	5-12
	Adding fillets	5-13
Chapter 6: Using	g Trim, Thicken & Configurations	6-1
	Opening a part document	6-1
	Trimming the surfaces	6-1
	Mirroring a surface body	6-2
	Creating a lofted surface	6-3
	Patching the ends	6-4
	Creating the led holes	6-5
	Making the power cord opening	6-6
	Knitting the surfaces	6-7
	Adding fillets	6-7
	Adding thickness	6-8
	Creating a recess cut	6-9
	Making the cover plate	6-10
	Creating a cut using offset from surface	6-13
	Using Configurations	6-15
	Adding a new configuration	6-15
	Modifying dimensions	6-16
	Adding other configurations	6-17
	Toggling between the configurations	6-18
Chapter 7: Curve	ed Driven Pattern & Flex Bending	7-1
	Opening a part document	7-1
	Creating a 3D sweep path	7-1
	Creating a swept surface	7-2
	Creating a curve driven pattern	7-3

	Stent designs – Exercise 1	7-5
	Creating a planar surface	7-5
	Creating a rolled pattern	7-6
	Thickening a surface model	7-7
	Stent designs - Exercise 2	7-8
	Creating a split sketch	7-9
	Creating a split line feature	7-10
	Deleting faces	7-10
	Adding thickness	7-11
	Creating an axis	7-12
	Creating a circular pattern	7-13
	Combining the solid bodies	7-14
	Stent designs - Exercise 3	7-15
	Creating the base sketch	7-15
	Creating a planar surface	7-16
	Trimming with a sketch	7-16
	Thickening the surface	7-17
	Creating a flex bending feature	7-18
Chapter 8: Su	rfaces & Solids- Hybrid Modeling	8-1
•	Opening a part document	8-1
	Creating the extruded surfaces	8-1
	Trimming the surfaces	8-4
	Adding fillets	8-5
	Thickening the surface model	8-7
	Adding the inner support feature	8-8
	Creating an extruded cut	8-9
	Adding the support ribs	8-10
	Adding the mounting bosses	8-11
	Adding fillets	8-12
	Saving the housing right-half	8-13
	Mirroring the part	8-13
	Creating an extruded cut feature	8-15
	Saving the left half	8-16
	Adding the alignment pins	8-17
	Adding chamfers	8-18
	Saving the right half	8-18
	Inserting a part document	8-19
	Creating an exploded view	8-20
Chapter 9: Mo	old Tools, Intersect & Display States	9-1
,	Opening a part document	9-1
	Sketch the base profile	9-1
	Creating a revolve surface	9-2

Making the sweep path	9-2
Adding a new plane	9-3
Making the sweep profile	9-4
Creating the 1st rib	9-4
Patterning the rib	9-4
Trimming the overlaps	9-5
Adding thickness	9-6
Adding fillets	9-7
Making a mold	9-8
Assigning material	9-8
Scaling the model	9-8
Creating a parting line	9-9
Creating the shut off surfaces	9-10
Creating the parting surfaces	9-11
Creating a tooling split	9-12
Making an exploded view	9-13
Renaming the bodies	9-14
Using Intersect	9-15
Opening a part document	9-15
Inserting a part	9-15
Moving a solid body	9-16
Using the intersect options	9-17
Using Display States	9-19
Creating the 1st display state	9-19
Changing appearances	9-20
Adding other display states	9-21
Toggling between the display states	9-23
Copying & Pasting the exploded view	9-24
Making an assembly feature cut	9-24
Chapter 10: Surface Repairs and Patches	10-1
Opening a part document	10-1
Creating the lofted surfaces	10-2
Patching the raised feature	10-3
Patching the corner of the keyway	10-5
Using the filled surface command	10-6
Using the lofted surface command	10-7
Using the boundary surface command	10-8
Creating the additional curves	10-9
Creating a loft with guide curves	10-10
Removing features	10-11
Deleting holes	10-12
Removing features	10-13
Knitting the surfaces	10-14

# Assigning material 10-15 Calculating the mass 10-15

## Glossary

## Index



Designed using SOLIDWORKS 2020, SPO