

# **Autodesk Fusion 360**

## **A Step-By-Step Tutorial**

### **Guide for Beginners**

#### **(2024 Edition)**



*Provider of High Quality Learning Material at Affordable Price*  
[www.sdacademy.com](http://www.sdacademy.com)

# Table of Contents

<b>Dedication .....</b>	<b>3</b>
<b>Preface .....</b>	<b>13</b>
<b>Chapter 1. Introducing Autodesk Fusion 360 .....</b>	<b>19 - 44</b>
Installing Autodesk Fusion 360 .....	20
Getting Started with Autodesk Fusion 360 .....	20
Working with User Interface .....	22
Toolbar .....	22
Application Bar .....	23
BROWSER .....	23
Help and Profile Menus .....	23
ViewCube .....	23
Timeline .....	24
Navigation Bar .....	24
Invoking a New Design File .....	24
Working with Workspaces .....	25
DESIGN Workspace .....	25
GENERATIVE DESIGN Workspace .....	28
RENDER Workspace .....	28
ANIMATION Workspace .....	28
SIMULATION Workspace .....	28
MANUFACTURE Workspace .....	29
DRAWING Workspace .....	29
Managing Data by Using the Data Panel .....	29
Creating a New Project Folder and Sub-Folders .....	30
Uploading Existing Files in a Project .....	31
Collaborating with Other Users .....	32
Filtering Project Display in the Data Panel .....	34
Opening Data Panel in Web Browser .....	34
Saving a Design File .....	35
Working in the Offline Mode .....	36
Exporting a Design to Other CAD Formats .....	37
Opening an Existing Design File .....	37
Opening an Existing File from the Data Panel .....	37
Opening an Existing File by using the Open tool .....	39
Opening an Existing File from the Local Computer .....	39
Recovering Unsaved Data .....	40
Sharing a Design .....	41
Invoking a Marking Menu .....	41
3D Printing .....	42
Exporting a Design in .STL File Format for 3D Printing .....	42
Summary .....	44
Questions .....	44
<b>Chapter 2. Creating and Editing Sketches .....</b>	<b>45 - 94</b>
Invoking the Sketching Environment .....	47
Drawing a Line .....	48

## 6 Table of Contents

Drawing a Tangent Arc by Using Line Tool .....	48
Drawing a Rectangle .....	49
2-Point Rectangle Tool .....	49
3-Point Rectangle Tool .....	50
Center Rectangle Tool .....	50
Drawing a Circle .....	50
Center Diameter Circle Tool .....	50
2-Point Circle Tool .....	50
3-Point Circle Tool .....	51
2-Tangent Circle Tool .....	51
3-Tangent Circle Tool .....	51
Drawing an Arc .....	52
3-Point Arc Tool .....	52
Center Point Arc Tool .....	52
Tangent Arc Tool .....	52
Drawing a Polygon .....	53
Circumscribed Polygon Tool .....	53
Inscribed Polygon Tool .....	53
Edge Polygon Tool .....	54
Drawing an Ellipse .....	54
Drawing a Slot .....	55
Center to Center Slot Tool .....	55
Overall Slot Tool .....	55
Center Point Slot Tool .....	56
Three Point Arc Slot Tool .....	56
Center Point Arc Slot Tool .....	56
Drawing a Conic Curve .....	57
Drawing a Spline .....	57
Fit Point Spline Tool .....	57
Control Point Spline Tool .....	58
Editing a Spline .....	58
Inserting Text into a Sketch .....	59
Inserting Text by Drawing a Rectangular Frame .....	59
Inserting Text along a Path .....	60
Editing and Modifying Sketches .....	61
Trimming Sketch Entities .....	61
Extending Sketch Entities .....	61
Mirroring Sketch Entities .....	62
Offsetting Sketch Entities .....	62
Applying Constraints .....	64
Horizontal Constraint .....	65
Vertical Constraint .....	65
Coincident Constraint .....	65
Collinear Constraint .....	65
Perpendicular Constraint .....	65
Parallel Constraint .....	65
Tangent Constraint .....	66
Concentric Constraint .....	66
Equal Constraint .....	66
Midpoint Constraint .....	66
Symmetry Constraint .....	66
Curvature Constraint .....	66

Fix Constraint .....	66
Applying Dimensions .....	66
Working with Different States of a Sketch .....	67
Under-Defined Sketch .....	67
Fully Defined Sketch .....	67
Tutorial 1: Creating a Sketch .....	68
Invoking Autodesk Fusion 360 .....	68
Starting a New Design File .....	69
Organizing the Data Panel .....	70
Specifying Units .....	72
Invoking the Sketching Environment .....	73
Specifying Grid and Snap Settings .....	74
Creating a Sketch .....	74
Applying Dimensions .....	78
Applying Constraints .....	80
Saving the Sketch .....	81
Tutorial 2: Creating and Editing a Sketch .....	82
Starting a New Design File and Specifying Units .....	83
Specifying Grid Settings .....	84
Creating a Sketch .....	84
Trimming Sketch Entities .....	88
Applying Constraints .....	89
Applying Dimensions .....	90
Saving the Sketch .....	92
Exercise 1 .....	92
Exercise 2 .....	92
Exercise 3 .....	93
Exercise 4 .....	93
Exercise 5 .....	93
Summary .....	94
Questions .....	94

### **Chapter 3. Creating Extrude and Revolve Features ..... 95 - 120**

Introduction to an Extrude Feature .....	97
Tutorial 1: Creating an Extrude Feature .....	97
Invoking Autodesk Fusion 360 .....	98
Starting a New Design File .....	98
Specifying Units .....	98
Creating a Sketch of the Extrude Feature .....	99
Creating the Extrude Feature .....	103
Saving the model .....	106
Introduction to a Revolve Feature .....	106
Tutorial 2: Creating a Revolve Feature .....	107
Starting a New Design File and Specifying Units .....	107
Creating a Sketch of the Revolve Feature .....	108
Mirroring the Sketch Entities .....	112
Applying Dimensions .....	112
Creating a Revolve Feature .....	116
Saving the Model .....	117
Exercise 1 .....	118
Exercise 2 .....	118
Exercise 3 .....	119

## 8 Table of Contents

Exercise 4 .....	119
Summary .....	120
Questions .....	120

### **Chapter 4. Creating Multi-Feature 3D Models ..... 121 - 170**

Navigating a 3D Model in Graphics Area .....	121
Controlling the Navigation Settings .....	122
Pan .....	123
Zoom .....	124
Zoom Window .....	124
Fit .....	124
Free Orbit .....	124
Constrained Orbit .....	125
Look At .....	125
Navigating a 3D Model by Using the ViewCube .....	125
Tutorial 1: Creating Fixture Block .....	128
Starting a New Design File .....	128
Creating the Base Extrude Feature .....	129
Creating the Second Extrude Feature .....	130
Creating an Extrude Cut Feature .....	132
Creating a Rib Feature .....	134
Creating a Chamfer .....	137
Assigning the Material .....	139
Calculating Mass Properties .....	140
Saving the model .....	141
Tutorial 2: Creating Toggle Lever .....	141
Starting Fusion 360 and a New Design File .....	142
Creating the Base Extrude Feature .....	142
Creating the Extrude Cut Feature .....	145
Mirroring a Feature .....	148
Creating the Second Extrude Cut Feature .....	149
Assigning the Material .....	150
Calculating Mass Properties .....	152
Saving the model .....	152
Tutorial 3: Creating Valve Body .....	153
Starting Fusion 360 and a New Design File .....	154
Creating the Revolve Feature .....	154
Creating the Extrude Feature .....	155
Creating the Second Extrude Feature .....	158
Creating the Extrude Cut Feature .....	159
Creating the Second Extrude Cut Feature .....	161
Creating a Circular Pattern .....	162
Mirroring Features .....	163
Creating the Remaining Features .....	164
Assigning the Material .....	164
Calculating Mass Properties .....	165
Saving the Model .....	166
Exercise 1 .....	167
Exercise 2 .....	168
Exercise 3 .....	169
Summary .....	169
Questions .....	169

<b>Chapter 5. Creating Sweep and Loft Features .....</b>	<b>171 - 198</b>
Introduction to Sweep Features .....	171
Tutorial 1: Creating a Sweep Feature .....	173
Starting Fusion 360 and a New Design File .....	173
Creating the Sweep Feature .....	174
Creating the Extrude Feature .....	176
Creating the Extrude Cut Feature .....	177
Creating the Circular Pattern .....	178
Creating Remaining Features .....	179
Saving the model .....	180
Introduction to Loft Features .....	180
Tutorial 2: Creating a Loft Feature .....	182
Starting Fusion 360 and a New Design File .....	182
Creating the Loft Feature .....	182
Creating the Loft Feature with Profiles and a Guide Rail .....	186
Saving the model .....	188
Tutorial 3: Creating a Loft Cut Feature .....	189
Starting a New Design File and Specifying Units .....	190
Creating the Extrude Feature .....	190
Creating the Extrude Cut Feature .....	191
Creating the Second Extrude Cut Feature .....	192
Creating the Loft Cut Feature .....	193
Creating the Second Loft Cut Feature .....	194
Saving the Model .....	195
Exercise 1 .....	196
Exercise 2 .....	196
Exercise 3 .....	197
Summary .....	197
Questions .....	197
<b>Chapter 6. Creating Holes, Threads, and Shell Features .....</b>	<b>199 - 226</b>
Introduction to Holes .....	199
Tutorial 1: Creating Holes .....	200
Starting Fusion 360 and a New Design File .....	200
Creating the Extrude Feature .....	201
Creating the Extrude Cut Feature .....	203
Mirroring a Feature .....	203
Creating a Hole .....	204
Creating the Rectangular Pattern .....	208
Saving the Model .....	210
Introduction to Threads .....	211
Tutorial 2: Creating Threads .....	212
Starting a New Design File and Specifying Units .....	212
Creating the Sweep Feature .....	212
Creating Threads .....	215
Saving the Model .....	217
Introduction to Shell Features .....	217
Tutorial 3: Creating a Shell Feature .....	218
Starting a New Design File and Specifying Units .....	219
Creating the Extrude Feature .....	219
Creating Fillets .....	220

## 10 Table of Contents

Creating the Shell Feature .....	223
Saving the Model .....	224
Exercise 1 .....	225
Exercise 2 .....	225
Summary .....	226
Questions .....	226
<b>Chapter 7. Creating 3D Sketches and Helical Coils .....</b>	<b>227 - 254</b>
Introduction to 3D Sketches .....	227
Tutorial 1: Creating a 3D Sketch .....	228
Starting Fusion 360 and a New Design File .....	228
Creating the 3D Sketch .....	229
Creating the Pipe Feature .....	234
Creating the Mirror Feature .....	237
Combining Bodies .....	239
Creating the Shell Feature .....	240
Creating the Extrude Feature .....	241
Creating the Second Mirror Feature .....	242
Creating the Second Extrude Feature .....	243
Saving the Model .....	244
Introduction to Helical Coils .....	245
Tutorial 2: Creating a Helical Coil .....	245
Starting Fusion 360 and a New Design File .....	246
Creating the Helical Coil .....	246
Creating the Sweep Feature .....	248
Creating the Second Sweep Feature .....	250
Saving the Model .....	252
Exercise 1 .....	252
Exercise 2 .....	253
Summary .....	253
Questions .....	253
<b>Chapter 8. Creating Assemblies - I .....</b>	<b>255 - 326</b>
Introduction to Bottom-up Assembly .....	256
Working with Joints .....	256
Rigid Joint .....	256
Revolute Joint .....	257
Slider Joint .....	257
Cylindrical Joint .....	257
Pin-slot Joint .....	258
Planar Joint .....	258
Ball Joint .....	258
Tutorial 1: Creating the Single Cylinder Engine Assembly .....	259
Starting Fusion 360 and Creating all Components .....	262
Inserting the First Component into a Design File .....	262
Grounding/Fixing the First Component .....	265
Inserting the Second Component of the Assembly .....	266
Applying the Revolute Joint .....	267
Inserting and Assembling the Third Component .....	270
Inserting and Assembling the Fourth Component .....	272
Inserting and Assembling the Fifth Component .....	275
Applying the Slider Joint .....	277

Hiding the Joint Symbols in the Graphics Area .....	278
Animating the Assembly .....	278
Saving the Model .....	279
Tutorial 2: Creating the Blow Off Cock Assembly .....	280
Starting Fusion 360 and Creating all Components .....	283
Inserting the First Component into a Design File .....	283
Grounding/Fixing the First Component .....	286
Creating the Section View of an Assembly .....	287
Inserting the Second Component of the Assembly .....	288
Applying the Revolute Joint .....	289
Turning Off the Section View .....	291
Inserting the Third Component .....	291
Applying the Rigid Joint .....	292
Inserting and Assembling the Fourth Component .....	293
Inserting and Assembling the Fifth Component .....	295
Inserting and Assembling the Remaining Components .....	297
Saving the Model .....	297
Tutorial 3: Creating the Manual Press Assembly .....	298
Starting Fusion 360 and Creating all Components .....	303
Inserting the First Component into a Design File .....	303
Grounding/Fixing the First Component .....	305
Inserting the Second Component of the Assembly .....	305
Applying the Rigid Joint .....	306
Inserting and Assembling the Third Component .....	308
Inserting and Assembling the Fourth Component .....	309
Inserting and Assembling the Fifth Component .....	311
Inserting and Assembling the Sixth Component .....	313
Inserting the Seventh Component .....	314
Applying the Slider Joint .....	314
Inserting and Assembling the Remaining Components .....	317
Defining Relative Motion between Two Joints .....	317
Saving the Model .....	319
Exercise 1 .....	320
Summary .....	325
Questions .....	325

## **Chapter 9. Creating Assemblies - II ..... 327 - 350**

Introduction to Top-down Assembly .....	327
Creating Components within a Design File .....	327
Creating a New Empty Component .....	327
Creating a New Component from Existing Bodies .....	329
Creating a Component During an Active Tool .....	330
Tutorial 1: Creating the V-Block Assembly .....	331
Starting Fusion 360 and a New Design File .....	333
Creating the First Component within a Design File .....	333
Creating the Second Component within the Design File .....	335
Creating the Third Component .....	340
Activating the Parent Assembly .....	343
Applying As-built Joint .....	344
Saving the Assembly File .....	346
Exercise 1 .....	347
Summary .....	350
Questions .....	350

## 12 Table of Contents

<b>Chapter 10. Creating Animation and Exploded Views .....</b>	<b>351 - 372</b>
Invoking the ANIMATION Workspace .....	351
Capturing Views on the Timeline .....	352
Capturing Actions on the Timeline .....	353
Transforming Components (Move or Rotate) .....	353
Creating an Exploded View of an Assembly .....	356
Toggling on or off the Visibility of Components .....	359
Creating a Callout with Annotation .....	360
Customizing Views and Actions .....	360
Deleting Views and Actions of a Storyboard .....	361
Creating a New Storyboard .....	362
Toggling On or Off Capturing Views .....	363
Playing and Publishing Animation .....	363
Tutorial 1: Creating Exploded View of the Blow Off Cock Assembly .....	364
Opening Tutorial 2 of Chapter 8 .....	365
Invoking the ANIMATION Workspace .....	365
Creating the Exploded View .....	366
Renaming the Storyboard .....	369
Playing the Animation .....	370
Publishing and Saving the Animation .....	370
Saving the Model .....	371
Exercise 1 .....	371
Summary .....	372
Questions .....	372
<b>Chapter 11. Creating 2D Drawings .....</b>	<b>373 - 406</b>
Introduction to 2D Drawings .....	373
Tutorial 1: Creating Drawing Views of the Valve Body Component .....	374
Opening the Tutorial 3 of Chapter 4 .....	374
Defining the Angle of Projection .....	375
Invoking the DRAWING Workspace and Creating Base View .....	377
Creating Projected Views .....	382
Creating the Section View .....	384
Creating the Detail View .....	387
Applying Dimensions .....	388
Editing Dimensions .....	391
Saving the Model .....	392
Tutorial 2: Creating Drawing Views of the Blow Off Cock Assembly .....	392
Opening the Tutorial 2 of Chapter 8 .....	393
Invoking the DRAWING Workspace and Creating Base View .....	393
Creating the Section View .....	396
Creating the Projected View .....	397
Creating the Exploded View .....	399
Creating the Bill of Material (BOM) and Adding Balloons .....	401
Exporting the Parts List as a CSV File .....	402
Exporting the Drawing as a PDF File .....	403
Saving the Model .....	404
Exercise 1 .....	404
Summary .....	405
Questions .....	405

<b>Index .....</b>	<b>407 - 412</b>
--------------------	------------------

---