

# Table of Contents

<b>Dedication</b>	iii
<b>Preface</b>	xv

## Chapter 1: Introduction to Solid Edge

Introduction to Solid Edge	1-2
Solid Edge Environments <i>Enhanced</i>	1-6
System Requirements for Solid Edge ST2	1-8
Important Terms and Definitions <i>Enhanced</i>	1-8
Getting Started with Solid Edge ST2	1-11
User Interface of Solid Edge	1-13
Simulation Express <i>New</i>	1-17
Using Intellisketch	1-17
Units for Dimensions	1-18
Automatic Saving Option	1-18
Color Scheme in Solid Edge	1-18
Self-Evaluation Test	1-20

## Chapter 2: Drawing Sketches for Solid Models

The Sketching Environment	2-2
Starting the Part Environment in Solid Edge	2-3
Starting a New Part Document by Using the New Dialog Box	2-4
Invoking the Sketching Environment	2-6
Sketching Tools	2-6
Drawing Lines	2-6
Drawing Circles	2-9
Drawing Ellipses	2-11
Placing Sketched Points	2-12
Drawing Arcs	2-12
Drawing Rectangles <i>New</i>	2-13
Drawing Polygons <i>New</i>	2-14
Drawing Curves	2-15
Converting Sketched Entities into Curves	2-16
Filleting Sketched Entities	2-16
Chamfering Sketched Entities	2-17
The Drawing Display Tools	2-18
Zooming on to an Area	2-18
Dynamically Zooming a Drawing	2-18
Fitting all Entities into the Current Display	2-19

Panning Drawings	2-19
Restoring the Original Orientation of the Sketching Plane	2-19
Selecting Sketched Entities	2-20
Deleting Sketched Entities	2-20
Tutorial 1	2-21
Tutorial 2	2-26
Tutorial 3	2-30
Self-Evaluation Test	2-33
Review Questions	2-34
Exercise 1	2-35
Exercise 2	2-36

### Chapter 3: Adding Relationships and Dimensions to Sketches

Geometric Relationships	3-2
Connect Relationship	3-2
Concentric Relationship	3-3
Horizontal/Vertical Relationship	3-3
Collinear Relationship	3-4
Parallel Relationship	3-4
Perpendicular Relationship	3-4
Lock Relationship	3-4
Rigid Set Relationship	3-5
Tangent Relationship	3-5
Equal Relationship	3-5
Symmetric Relationship	3-6
Setting the Symmetry Axis	3-6
Controlling the Display of Relationship Handles	3-7
Conflicts in Relationships	3-7
Deleting Relationships	3-7
Dimensioning the Sketched Entities	3-7
Adding Linear Dimensions	3-8
Adding Aligned Dimensions	3-11
Adding Angular Dimensions	3-12
Adding Diameter Dimensions	3-14
Adding Radial Dimensions	3-14
Adding Symmetric Diameter Dimensions	3-15
Adding Coordinate Dimensions	3-16
Adding Angular Coordinate Dimensions	3-16
Adding Automatic Dimensions	3-17
Understanding the Concept of Fully Constrained Sketches	3-18
Measuring Sketched Entities	3-18
Measuring Distances	3-18
Measuring the Total Length of a Closed Loop or an Open Sketch	3-19
Measuring an Area	3-19
Calculating the Area Properties	3-20
Tutorial 1	3-21

Tutorial 2	3-27
Tutorial 3	3-30
Self-Evaluation Test	3-34
Review Questions	3-34
Exercise 1	3-35
Exercise 2	3-36

## Chapter 4: Editing, Extruding, and Revolving the Sketches

Editing the Sketches	4-2
Trimming the Sketched Entities	4-2
Extending the Sketched Entities	4-2
Trimming/Extending Entities to a Corner	4-3
Creating Splits in Sketched Entities	4-3
Creating Offset Copies	4-3
Creating Symmetric Offset Copies	4-4
Moving/Copying the Sketched Entities	4-6
Rotating the Sketched Entities	4-7
Mirroring the Sketched Entities	4-7
Scaling the Sketched Entities	4-8
Stretching the Sketched Entities	4-9
Editing the Sketched Entities by Dragging	4-9
Writing Text in the Sketching Environment	4-10
Inserting Images into the Sketches	4-11
Converting Sketches into Base Features	4-13
Creating Base Features Using the Extrude Tool	4-14
Creating Base Features Using the Revolve Tool	4-17
Rotating the View of a Model in 3D Space	4-20
Restoring Standard Views	4-20
Setting the Display Modes	4-21
Shaded with Visible Edges	4-21
Shaded	4-21
Visible and Hidden Edges	4-21
Visible Edges	4-22
Drop Shadow	4-22
Outline with Drop Shadow	4-22
Improving the Display Quality of the Model	4-22
Tutorial 1	4-22
Tutorial 2	4-27
Tutorial 3	4-29
Self-Evaluation Test	4-31
Review Questions	4-32
Exercise 1	4-33
Exercise 2	4-33
Exercise 3	4-33

## Chapter 5: Working with Additional Reference Geometries

Additional Sketching and Reference Planes	5-2
Local Reference Planes	5-2
Global Reference Planes	5-3
Creating Reference Planes	5-3
Creating a Coincident Plane	5-3
Creating a Parallel Plane	5-5
Creating an Angled Plane	5-6
Creating a Perpendicular Plane	5-6
Creating a Plane Coincident by Axis	5-7
Creating a Plane Normal to an Edge or a Sketched Curve	5-7
Creating a Plane Using Three Points	5-8
Creating a Tangent Plane	5-9
Displaying the Reference Axes	5-9
Understanding Coordinate Systems	5-10
Creating a Coordinate System	5-10
Using Other Options of the Extrude Tool	5-12
Creating Cutout Features	5-18
Creating Extruded Cutouts	5-19
Creating Revolved Cutouts	5-21
Using the Edges of the Existing Features	5-22
Advanced Drawing Display Tools	5-23
Creating User-defined Named Views	5-24
Using Common Views	5-24
Tutorial 1	5-24
Tutorial 2	5-30
Tutorial 3	5-34
Self-Evaluation Test	5-38
Review Questions	5-39
Exercise 1	5-40
Exercise 2	5-41

## Chapter 6: Advanced Modeling Tools-I

Advanced Modeling Tools	6-2
Creating Holes	6-2
Creating Rounds	6-9
Creating the Constant Radius Round	6-9
Creating the Variable Radius Round	6-14
Creating Chamfers	6-15
Creating Rectangular and Circular Patterns <i>Enhanced</i>	6-16
Creating Rectangular Patterns	6-16
Creating Circular Patterns	6-21
Creating the Pattern Along a Curve	6-23
Mirroring Features and Bodies	6-27
Mirroring Selected Features	6-27
Mirroring Bodies	6-27

Tutorial 1	6-28
Tutorial 2	6-33
Tutorial 3	6-37
Self-Evaluation Test	6-44
Review Questions	6-44
Exercise 1	6-46
Exercise 2	6-47
Exercise 3	6-48

## **Chapter 7: Editing Features**

Editing Features in a Model	7-2
Suppressing Features	7-4
Unsuppressing the Suppressed Features	7-5
Deleting Features	7-5
Copying and Pasting Features	7-5
Rolling Back a Model to a Feature	7-6
Assigning Color to a Part, Feature, or Face	7-7
Playing Back the Construction of Features	7-7
Checking the Physical Properties of a Model	7-8
Modifying the Display of Construction Entities	7-8
Tutorial 1	7-9
Tutorial 2	7-14
Tutorial 3	7-18
Self-Evaluation Test	7-21
Review Questions	7-22
Exercise 1	7-22
Exercise 2	7-23

## **Chapter 8: Advanced Modeling Tools-II**

Advanced Modeling Tools	8-2
Creating Internal and External Threads	8-2
Adding Drafts to the Model	8-4
Adding Ribs to the Model	8-6
Adding Thin Wall Features	8-9
Adding Thin Wall to a Particular Region	8-11
Adding a Lip to the Model	8-13
Creating Web Networks	8-14
Creating Vents	8-15
Creating Mounting Bosses	8-19
Reordering Features	8-23
Tutorial 1	8-24
Tutorial 2	8-26
Tutorial 3	8-30
Self-Evaluation Test	8-35
Review Questions	8-36

Exercise 1	8-37
Exercise 2	8-38

## Chapter 9: Advanced Modeling Tools-III

Advanced Modeling Tools	9-2
Creating Swept Protrusions	9-2
Creating Swept Cutouts	9-9
Creating Lofted Protrusions	9-9
Creating Lofted Cutouts	9-15
Creating Helical Protrusions	9-15
Creating Normal Protrusions	9-21
Creating Normal Cutouts	9-22
Tutorial 1	9-22
Tutorial 2	9-31
Tutorial 3	9-39
Self-Evaluation Test	9-45
Review Questions	9-46
Exercise 1	9-47
Exercise 2	9-48

## Chapter 10: Getting Started with Synchronous Technology

Synchronous Part Environment	10-2
Terms and Definitions	10-3
Sketching in the Synchronous Part Environment	10-3
Locking and Unlocking the Sketching Planes	10-4
Modeling in the Synchronous Part Environment	10-4
Creating an Extruded Feature	10-5
Creating Revolved Features	10-5
Creating Cut Features	10-6
Adding Dimensions	10-6
Dimensioning a Feature	10-6
Dimensioning Holes	10-7
Adding Relations	10-7
Align Faces	10-8
Live Rules	10-9
Other Selection Handles	10-10
Reference Plane Handle	10-10
Selection Manager	10-10
Editing Features	10-11
Modifying Faces Using the Steering Wheel	10-12
Modifying the Model by Editing Dimensions	10-14
Modifying the Model by Detaching and Attaching Faces	10-14
Modifying the Model by Isolating Features	10-15
Evolving a 3D Model from a 2D Drawing <b>New</b>	10-17
Tutorial 1	10-18

Tutorial 2	10-23
Tutorial 3	10-28
Self-Evaluation Test	10-34
Review Questions	10-34
Exercise 1	10-35

## **Chapter 11: Assembly Modeling-I (Traditional & Synchronous)**

The Assembly Environment	11-2
Working with the Assembly Environment	11-2
Types of Assembly Design Approaches	11-2
Creating the Bottom-Up Assembly	11-4
Assembling the First Component	11-4
Assembling the Second Component	11-4
Applying Assembly Relationships	11-6
Creating the Top-Down Assembly	11-15
Creating a Component in the Top-Down Assembly	11-15
Creating the Pattern of Components in an Assembly	11-17
Creating a Reference Pattern	11-17
Creating Material Removal Features in an Assembly	11-18
Assembly Features	11-18
Assembly-driven Part Features	11-18
Moving the Individual Components <i>Enhanced</i>	11-19
Procedure for Moving the Components	11-19
Moving Multiple Components	11-20
Tutorial 1	11-21
Tutorial 2	11-36
Self-Evaluation Test	11-44
Review Questions	11-44
Exercise 1	11-45

## **Chapter 12: Assembly Modeling-II (Traditional & Synchronous)**

Creating Subassemblies	12-2
Editing Assembly Relationships	12-3
Modifying the Values	12-3
Applying Additional Relationships	12-4
Modifying Assembly Relationships	12-5
Editing Assembly Components	12-6
Modifying Synchronous Assembly Components	12-6
Dispersing Subassemblies	12-6
Replacing Components	12-7
Simplifying Assemblies Using Visibility Options	12-8
Hiding and Displaying the Components	12-8
Changing Transparency Conditions	12-8
Interference Detection in Assemblies	12-8
Interference Options	12-9

Checking for the Interference	12-11
Creating the Exploded State of Assemblies	12-11
Automatic Explode	12-12
Unexploding Assemblies	12-13
Exploding Assemblies Manually	12-14
Changing the Distance between the Components <b>New</b>	12-16
Repositioning Parts	12-16
Removing Parts	12-16
Generating Flowlines	12-17
Tutorial 1	12-17
Tutorial 2	12-24
Tutorial 3	12-32
Self-Evaluation Test	12-35
Review Questions	12-35
Exercise 1	12-36

### **Chapter 13: Generating, Editing, and Dimensioning the Drawing Views**

The Draft Environment	13-2
Types of Views Generated in Solid Edge	13-3
Generating Drawing Views	13-4
Generating the Base View	13-4
Generating the Principal View	13-8
Generating the Auxiliary View	13-10
Generating the Section View	13-12
Generating the Broken-Out Section View	13-15
Generating the Detail View	13-17
Generating the Broken View	13-18
Working with Interactive Drafting	13-19
Manipulating Drawing Views	13-19
Aligning Drawing Views	13-19
Modifying the Scale of Drawing Views	13-20
Cropping the Drawing Views	13-20
Moving the Drawing Views	13-20
Rotating the Drawing Views	13-20
Applying the Hatch Pattern	13-21
Modifying the Properties of Drawing Views	13-21
Adding Annotations to the Drawing Views	13-22
Adding New Drawing Sheets	13-26
Editing the Default Sheet Format	13-26
Generating the Exploded Views of Assemblies	13-26
Creating Associative Balloons and Parts List	13-27
Parts List Properties Dialog Box <b>Enhanced</b>	13-28
Settings the Text Properties <b>Enhanced</b>	13-32
Tutorial 1	13-33
Tutorial 2	13-39



Tutorial 3	13-44
Self-Evaluation Test	13-47
Review Questions	13-48
Exercise 1	13-49
Exercise 2	13-50

## **Chapter 14: Surface Modeling (Traditional & Synchronous)**

Surface Modeling	14-2
Creating Surfaces in Solid Edge	14-2
Creating an Extruded Surface	14-2
Creating a Revolved Surface	14-3
Creating a Swept Surface	14-4
Creating Surfaces Using the BlueSurf Tool	14-6
Creating Surfaces Using the Bounded Tool	14-12
Stitching Multiple Surfaces to Create a Single Surface	14-13
Creating Offset Surfaces	14-14
Copying a Surface	14-14
Creating a BlueDot	14-15
Creating a Curve at the Intersection of Two Surfaces	14-17
Trimming the Surfaces	14-17
Extending the Surfaces	14-18
Replacing the Faces of a Part with a Surface	14-20
Splitting Faces	14-20
Creating Curves in 3D by Selecting Keypoints	14-20
Creating Curves by Table	14-22
Projecting the Curves on Surfaces	14-23
Creating a Curve at the Projection of Two Curves	14-24
Drawing a Curve on a Surface	14-24
Deriving Curves	14-25
Splitting a Curve	14-26
Splitting a Body	14-26
Adding Thickness to a Surface	14-27
Creating Rounds Using Blending	14-28
Adding a Draft	14-34
Using the Parting Split Tool	14-36
Using the Parting Surface Tool	14-37
Tutorial 1	14-38
Tutorial 2	14-43
Self-Evaluation Test	14-51
Review Questions	14-51
Exercise 1	14-52
Exercise 2	14-53
Exercise 3	14-53

## Chapter 15: Sheet Metal Design (Traditional & Synchronous)

The Sheet Metal Module	15-2
Setting the Sheet Metal Part Properties	15-4
Creating the Base of the Sheet Metal Parts <i>Enhanced</i>	15-7
Adding Flanges to a Sheet Metal Part	15-7
Adding Flanges in Synchronous Sheet Metal	15-12
Creating Contour Flanges	15-13
Adding Contour Flanges in Synchronous Sheet Metal	15-16
Creating Lofted Flanges	15-16
Adding the Jog to the Sheet <i>Enhanced</i>	15-17
Bending the Sheet Metal Part <i>Enhanced</i>	15-19
Unbending the Sheet Metal Part (Traditional only)	15-20
Rebending the Sheet Metal Part (Traditional only)	15-20
Filleting or Chamfering Corners of a Sheet Metal Part	15-21
Closing the 2 Bend Corners of a Sheet Metal Part <i>Enhanced</i>	15-21
Creating Dimples in a Sheet Metal Part <i>Enhanced</i>	15-23
Creating Louvers in a Sheet Metal Part <i>Enhanced</i>	15-25
Creating Drawn Cutouts in a Sheet Metal Part <i>Enhanced</i>	15-28
Creating Beads in a Sheet Metal Part <i>Enhanced</i>	15-28
Adding Gussets to a Sheet Metal Part <i>Enhanced</i>	15-31
Adding Hems	15-34
Converting a Solid Part into a Sheet Metal Part <i>Enhanced</i>	15-37
Ripping the Corners of a Solid Part	15-39
Creating the Flat Pattern of a Sheet Metal Part <i>Enhanced</i>	15-39
Saving a Sheet Metal Part in the Flat Pattern Format	15-40
Tutorial 1	15-41
Tutorial 2	15-46
Self-Evaluation Test	15-54
Review Questions	15-54
Exercise 1	15-55
Exercise 2	15-57

## Chapter 16: Student Projects

Project 1	16-2
Project 2	16-28
Exercise 1	16-42