Table of Contents

Dedication iii
Preface xv

Chapter 1: Introduction to Solid Edge ST3

Introduction to Solid Edge ST3 1-2
Solid Edge Environments Enhanced 1-6
System Requirements for Solid Edge ST3 1-8
Important Terms and Definitions Enhanced 1-8
Getting Started with Solid Edge ST3 1-12
User Interface of Solid Edge ST3 Enhanced 1-13
Radial Menu New 1-17
Simulation Express 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

Sketching in the Part Environment 2-2
Starting the Part Environment in Solid Edge 2-2
Starting a New Part file by Using the New Dialog Box 2-3
Transition between Part Environments New 2-6
Starting a Sketch in the Part Environment 2-6
Sketching Tools 2-7
Drawing Lines 2-7
Drawing Circles 2-10
Drawing Ellipses 2-11
Placing Sketched Points 2-12
Drawing Arcs 2-12
Drawing Rectangles 2-13
Drawing Polygons 2-15
Drawing Curves 2-16
Converting Sketched Entities into Curves 2-16
Filleting Sketched Entities 2-17
Chamfering Sketched Entities 2-17
The Drawing Display Tools 2-18
Zooming into an Area 2-18

Zooming Dynamically 2-19
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 2-20
Tutorial 2 2-25
Tutorial 3 2-28
Self-Evaluation Test 2-32
Review Questions 2-33
Exercise 1 2-34
Exercise 2 2-34

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 (Only in the Ordered) 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 (Only in the Ordered) 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 3-20
Tutorial 2 3-26
Tutorial 3 3-29
Self-Evaluation Test 3-33
Review Questions 3-33
Exercise 1 3-35
Exercise 2 3-35
Exercise 3 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 the Sketched Entities 4-3
Creating Offset Copies 4-4
Creating Symmetric Offset Copies 4-4
Moving/Copying the Sketched Entities 4-6
Rotating the Sketched Entities 4-7
Mirroring the Sketched Entities 4-8
Scaling the Sketched Entities 4-9
Stretching the Sketched Entities 4-9
Editing the Sketched Entities by Dragging 4-10
Writing Text in the Sketching Environment 4-11
Inserting Images into Sketches 4-12
Converting Sketches into Base Features 4-14
Creating Base Features Using the Select Tool 4-14
Creating an Extruded Feature 4-16
Creating Revolved Features 4-16
Creating Ordered Features 4-17
Creating Extruded Features 4-17
Creating Revolved Features 4-18
Rotating the View of a Model in 3D Space 4-18
Restoring Standard Views 4-19
Setting the Display Modes 4-19
Shaded with Visible Edges 4-20
Shaded 4-20
Visible and Hidden Edges 4-20
Visible Edges 4-20
Drop Shadow 4-20
Outline with Drop Shadow 4-20
Improving the Display Quality of a Model 4-20
Tutorial 1 4-20
Tutorial 2 4-25
Tutorial 3 4-27

Self-Evaluation Test 4-29
Review Questions 4-29
Exercise 1 4-30
Exercise 2 4-31
Exercise 3 4-32

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 (Synchronous) 5-3
Creating a Coincident Plane 5-3
Modifying Planes using the Steering Wheel 5-4
Creating a Plane Normal to an Edge or a Sketched Curve 5-5
Creating a Plane Using Three Points 5-6
Creating a Tangent Plane 5-6
Creating a Parallel Plane 5-7
Creating an Angled Plane 5-8
Creating a Perpendicular Plane (Ordered) 5-9
Creating a Plane Coincident by Axis (Ordered) 5-10
Displaying the Reference Axes (Ordered) 5-10
Understanding Coordinate Systems 5-10
Creating a Coordinate System 5-11
Using the Other Options of the Extrude Tool 5-13
Creating Cutout Features 5-17
Creating Extruded Cutouts (Ordered) 5-17
Creating Revolved Cutouts (Ordered) 5-19
Creating Cutouts (Synchronous) 5-20
Using the Edges of Existing Features 5-21
Projecting Edges (Ordered) 5-22
Advanced Drawing Display Tools 5-23
Creating User-defined Named Views 5-23
Using Common Views 5-24
Tutorial 1 5-24
Tutorial 2 5-29
Tutorial 3 5-34
Self-Evaluation Test 5-38
Review Questions 5-39
Exercise 1 5-40
Exercise 2 5-41
Exercise 3 5-42

Chapter 6: Advanced Modeling Tools-I

Advanced Modeling Tools 6-2
Creating Holes (Ordered) 6-2
Creating Holes (Synchronous) 6-9

Creating Rounds (Ordered) 6-10
Creating the Constant Radius Round 6-10
Creating the Variable Radius Round 6-15
Creating Chamfers (Ordered) 6-16
Creating Rectangular and Circular Patterns (Ordered) 6-18
Creating Rectangular Patterns 6-18
Creating Circular Patterns 6-23
Creating a Pattern along a Curve 6-25
Creating Patterns (Synchronous) 6-28
Creating Rectangular Patterns 6-28
Creating Circular Patterns 6-31
Creating a Pattern along a Curve 6-31
Fill Pattern 6-32
Mirroring Features and Bodies (Ordered Environment) 6-35
Mirroring Selected Features 6-35
Mirroring Bodies 6-36
Tutorial 1 6-37
Tutorial 2 6-41
Tutorial 3 6-45
Self-Evaluation Test 6-52
Review Questions 6-52
Exercise 1 6-54
Exercise 2 6-55
Exercise 3 6-56

Chapter 7: Editing Features

Editing Models in the Synchronous Environment 7-2
Adding Dimensions to the Model 7-2
Dimensioning a Feature 7-2
Dimensioning Holes 7-2
Adding Relations 7-3
Align Faces 7-3
Live Rules Enhanced 7-5
Advanced Live Rules 7-6
Other Selection Handles 7-6
Reference Plane Handle 7-7
Selection Manager 7-7
Modifying Faces Using the Steering Wheel 7-8
Modifying the Model by Editing Dimensions 7-9
Creating Live Sections New 7-10
Modifying the Model by Detaching and Attaching Faces 7-10
Modifying the Model by Isolating Features 7-11
Editing Features in the Ordered Environment 7-12
Suppressing Features 7-14
Unsuppressing the Suppressed Features 7-14
Deleting Features 7-15

Copying and Pasting Features 7-15
Rolling Back a Model to a Feature 7-15
Converting Ordered Features to Synchronous New 7-16
Assigning Color to a Part, Feature, or Face 7-16
Playing Back the Construction of Features 7-17
Checking the Physical Properties of a Model 7-17
Modifying the Display of Construction Entities 7-18
Tutorial 1 7-18
Tutorial 2 7-25
Tutorial 3 7-30
Tutorial 4 7-33
Self-Evaluation Test 7-37
Review Questions 7-38
Exercise 1 7-39
Exercise 2 7-39

Chapter 8: Advanced Modeling Tools-II

Advanced Modeling Tools 8-2
Creating Threads 8-2
Adding Drafts to the Model 8-3
Adding Ribs to the Model 8-5
Adding Thin Wall Features (Ordered Part) 8-9
Adding Thin Wall to a Particular Region 8-11
Adding a Lip to the Model 8-12
Creating Web Networks 8-14
Creating Vents 8-15
Creating Mounting Bosses (Ordered Part) 8-19
Reordering Features 8-22
Tutorial 1 8-23
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 9-14
Creating Helical Protrusions 9-15
Creating Normal Protrusions 9-20
Creating Normal Cutouts 9-20

Tutorial 1 9-21
Tutorial 2 9-29
Tutorial 3 9-37
Self-Evaluation Test 9-43
Review Questions 9-44
Exercise 1 9-45
Exercise 2 9-46

Chapter 10: Assembly Modeling-I

The Assembly Environment 10-2
Working with the Assembly Environment 10-2
Types of Assembly Design Approaches 10-2
Creating the Bottom-Up Assembly 10-3
Assembling the First Component 10-3
Assembling the Second Component 10-4
Applying Assembly Relationships 10-5
Creating the Top-Down Assembly 10-14
Creating a Component in the Top-Down Assembly 10-14
Creating the Pattern of Components in an Assembly 10-16
Creating a Reference Pattern 10-16
Creating Material Removal Features in an Assembly 10-17
Assembly Features 10-17
Assembly-driven Part Features 10-17
Moving the Individual Components 10-18
Procedure for Moving the Components 10-18
Moving Multiple Components 10-19
Tutorial 1 10-20
Tutorial 2 10-34
Self-Evaluation Test 10-42
Review Questions 10-42
Exercise 1 10-43

Chapter 11: Assembly Modeling-II

Creating Subassemblies 11-2
Editing the Assembly Relationships 11-3
Modifying the Values 11-3
Applying Additional Relationships 11-4
Modifying Assembly Relationships 11-4
Editing the Assembly Components 11-6
Modifying Synchronous Components in the Assembly Environment 11-6
Dispersing Subassemblies 11-6
Replacing Components 11-7
Simplifying Assemblies Using Visibility Options 11-7
Hiding and Displaying the Components 11-8
Changing Transparency Conditions 11-8

Interference Detection in Assemblies 11-8
Interference Options 11-8
Checking for the Interference 11-11
Creating the Exploded State of Assemblies 11-11
Automatic Explode 11-12
Unexploding Assemblies 11-13
Exploding Assemblies Manually 11-14
Changing the Distance between the Components 11-16
Repositioning the Parts 11-16
Removing the Parts 11-16
Generating Flowlines 11-17
Tutorial 1 11-17
Tutorial 2 11-24
Tutorial 3 11-32
Self-Evaluation Test 11-35
Review Questions 11-35
Exercise 1 11-36

Chapter 12: Generating, Editing, and Dimensioning the Drawing Views

The Draft Environment 12-2
Types of Views Generated in Solid Edge 12-3
Generating Drawing Views 12-4
Generating the Base View 12-4
Generating the Principal View 12-8
Generating the Auxiliary View 12-10
Generating the Section View 12-12
Generating the Broken-Out Section View 12-15
Generating the Detail View 12-17
Generating the Broken View 12-18
Working with Interactive Drafting 12-19
Manipulating Drawing Views 12-19
Aligning Drawing Views 12-19
Modifying the Scale of Drawing Views 12-20
Cropping the Drawing Views 12-20
Moving the Drawing Views 12-20
Rotating the Drawing Views 12-20
Applying the Hatch Pattern 12-21
Modifying the Properties of Drawing Views 12-21
Adding Annotations to the Drawing Views 12-22
Adding New Drawing Sheets 12-26
Editing the Default Sheet Format 12-26
Evolving a 3D Model form a 2D Drawing 12-26
Generating the Exploded Views of Assemblies 12-27
Creating Associative Balloons and Parts List Enhanced 12-28
Parts List Properties Dialog Box 12-29

Setting the Text Properties 12-33
Tutorial 1 12-35
Tutorial 2 12-41
Tutorial 3 12-46
Tutorial 4 12-52
Self-Evaluation Test 12-55
Review Questions 12-56
Exercise 1 12-57
Exercise 2 12-57

Chapter 13: Surface Modeling

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

Review Questions 13-52
Exercise 1 13-52
Exercise 2 13-53
Exercise 3 13-54

Chapter 14: Sheet Metal Design

The Sheet Metal Module 14-2
Setting the Sheet Metal Part Properties 14-4
Creating the Base of the Sheet Metal Parts 14-7
Adding Flanges to a Sheet Metal Part 14-8
Adding Flanges in Synchronous Sheet Metal 14-12
Creating Contour Flanges 14-13
Adding Contour Flanges in Synchronous Sheet Metal 14-16
Creating Lofted Flanges 14-17
Adding the Jog to the Sheet 14-18
Bending the Sheet Metal Part 14-19
Unbending the Sheet Metal Part 14-20
Rebending the Sheet Metal Part 14-21
Filleting or Chamfering Corners of a Sheet Metal Part 14-21
Closing the 2 Bend Corners of a Sheet Metal Part Enhanced 14-22
Creating Dimples in a Sheet Metal Part 14-24
Creating Louvers in a Sheet Metal Part 14-26
Creating Drawn Cutouts in a Sheet Metal Part 14-29
Creating Beads in a Sheet Metal Part 14-29
Adding Gussets to a Sheet Metal Part 14-32
Adding Hems 14-35
Converting a Solid Part into a Sheet Metal Part 14-39
Ripping the Corners of a Solid Part 14-41
Creating the Flat Pattern of a Sheet Metal Part Enhanced 14-41
Creating Flat Patterns in the Flat Pattern Environment 14-41
Saving a Sheet Metal Part in the Flat Pattern Format 14-42
Tutorial 1 14-43
Tutorial 2 14-51
Self-Evaluation Test 14-56

Chapter 15: Student Projects

Review Questions 14-56
Exercise 1 14-57
Project 1 15-2
Project 2 15-16
Exercise 1 15-43