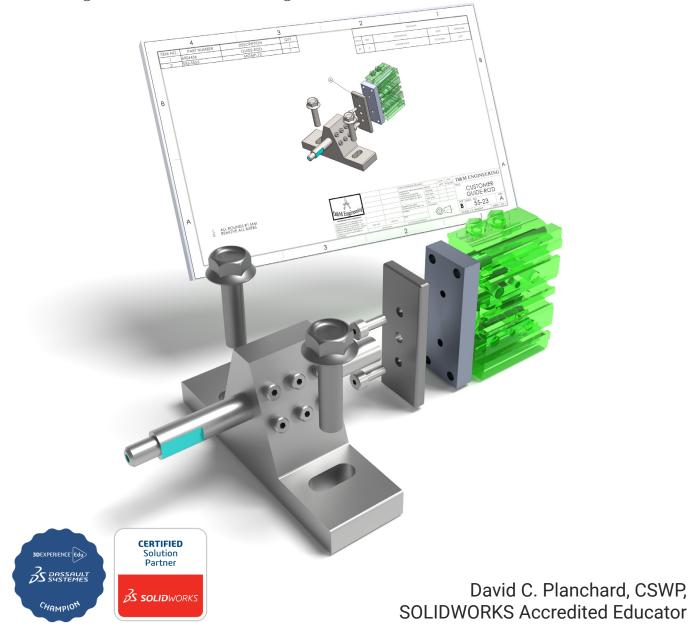
Engineering Design with SOLIDWORKS 2024

A Step-by-Step Project Based Approach Utilizing 3D Solid Modeling





Better Textbooks. Lower Prices. www.SDCpublications.com



Visit the following websites to learn more about this book:





Googlebooks



Table of Contents

Introduction	I-1
About the Author	I-3
Acknowledgements	I-5
Contact the Author	I-5
Note to Instructors	I-5
Trademarks, Disclaimer and Copyrighted Material	I-6
References	I-6
Table of Contents	I-7
Overview of Projects	I-19
What is SOLIDWORKS?	I-27
About the Book	I-29
Project 1 - Overview of SOLIDWORKS and the User Interface	1-1
Project Objective	1-3
What is SOLIDWORKS?	1-3
Basic concepts in SOLIDWORKS	1-3
Start a SOLIDWORKS Session	1-4
Tutorial: Start a SOLIDWORKS Session	1-4
Welcome dialog box	1-4
Home Tab	1-5
Recent Tab	1-5
Learn Tab	1-5
Alerts Tab	1-6
SOLIDWORKS User Interface (UI) and CommandManager	1-7
Menu Bar toolbar	1-7
Menu Bar menu (No model open)	1-8
Menu Bar Menu (Model open)	1-8
Drop-down menu (Open part)	1-8
Create a New Part Document	1-9
Novice Mode	1-10
Advanced Mode	1-10
Graphic Window (Default) View Default Sketch Planes	1-11
	1-12
Open a Part	1-12
Part FeatureManager	1-13
FeatureManager Rollback Bar Heads-up View toolbar	1-13 1-15
Dynamic Annotation Views	1-15
Zoom to Fit	1-15
Zoom to Area	1-15
Window-Select	1-15
Rotate	1-15
Front View	1-16
Right View	1-16
Top View	1-16
Trimetric view	1-16
SOLIDWORKS Help	1-16
SOLIDWORKS Tutorials	1-17
User Interface Tools	1-17

Right-click	1-18
Consolidated toolbar	1-18
System feedback icons	1-18
Confirmation Corner	1-19
Heads-up View toolbar	1-19
CommandManager (Default Part tab)	1-22
CommandManager (Default Drawing tab)	1-23
CommandManager (Default Assembly tab)	1-24
CommandManager (Float/Fit)	1-25
Collapse the CommandManager	1-25
FeatureManager Design Tree	1-26
FeatureManager design tree tab	1-26
PropertyManager tab	1-26
Configuration Manager tab	1-26
DimXpertManager tab	1-26
DisplayManager tab	1-26
CAM tab	1-26
Hide/Show tab	1-26
Sensors tool	1-26
Tags	1-27
Split	1-27
Fly-out FeatureManager	1-28
Task Pane	1-29
SOLIDWORKS Resources	1-29
Design Library	1-30
File Explorer	1-31
View Palette	1-31
Appearances, Scenes, and Decals	1-31
Custom Properties	1-32
3DEXPERIENCE files on This PC	1-32
3D EXPERIENCE	1-32
Dynamic Reference Visualization	1-33
Mouse Movements	1-34
Single-Click	1-34
Double-Click	1-34
Right-Click	1-34
Scroll Wheel	1-34
Saving SOLIDWORKS Documents as Previous version	1-35
Summary	1-36
Project 2 - Fundamentals of Part Modeling	2-1
Project Objective	2-3
Project Situation	2-4
Project Overview	2-6
File Management	2-7
Start a SOLIDWORKS Session	2-8
System Options	2-8
Part Document Template and Document Properties	2-10
PLATE Part Overview	2-13
PLATE Part-New SOLIDWORKS Document	2-15
Base Feature	2-16

Machined Part	2-17
Reference Planes and Orthographic Projection	2-18
PLATE Part-Extruded Boss/Base Feature	2-22
PLATE Part-Modify Dimensions and Rename	2-31
Display Modes, View Modes, View tools and Appearances	2-33
PLATE Part-Extruded Cut Feature	2-35
PLATE Part-Fillet Feature	2-41
PLATE Part-Hole Wizard Feature	2-43
ROD Part Overview	2-46
ROD Part-Extruded Boss/Base Feature	2-48
ROD Part-Hole Wizard Feature	2-50
ROD Part-Chamfer Feature	2-51
ROD Part-Extruded Cut Feature & Convert Entities Sketch Tool	2-52
ROD Part-View Orientation, Named Views & Viewport option	2-57
ROD Part-Copy/Paste Function	2-58
ROD Part-Design Changes with Rollback Bar	2-59
ROD Part-Recover from Rebuild Errors	2-61
ROD Part-Edit Part Appearance	2-65
GUIDE Part Overview	2-67
GUIDE Part-Extruded Boss/Base Feature and Dynamic Mirror	2-69
GUIDE Part-Extruded Cut Slot Profile	2-72
GUIDE Part-Mirror Feature	2-76
GUIDE Part-Holes	2-77
GUIDE Part-Linear Pattern Feature	2-80
GUIDE Part-Materials Editor and Mass Properties	2-82
Manufacturing Considerations	2-82
•	
Project Nummary	2_87
Project Summary Ouestions	2-87 2-89
Questions	2-87 2-89
Questions	2-89
Questions Project 3 - Fundamentals of Assembly Modeling	2-89 3-1
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective	2-89 3-1 3-3
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation	2-89 3-1 3-3 3-4
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview	2-89 3-1 3-3 3-4 3-5
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach	2-89 3-1 3-3 3-4 3-5 3-5
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion	2-89 3-1 3-3 3-4 3-5 3-5 3-5 3-6
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-17
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-17 3-18
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates Quick Mate	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-17 3-18 3-18
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-17 3-18 3-18 3-20
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component GUIDE-ROD Assembly - Mate the PLATE Component	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-17 3-18 3-20 3-22
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component GUIDE-ROD Assembly - Mate the PLATE Component GUIDE-ROD Assembly - Mate Errors	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-17 3-18 3-20 3-22 3-27
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component GUIDE-ROD Assembly - Mate the PLATE Component GUIDE-ROD Assembly - Mate Errors Collision Detection	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-17 3-18 3-20 3-22 3-27 3-29
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component GUIDE-ROD Assembly - Mate the PLATE Component GUIDE-ROD Assembly - Mate Errors Collision Detection Modify Component Dimension	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-16 3-17 3-18 3-18 3-20 3-22 3-27 3-29 3-30
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component GUIDE-ROD Assembly - Mate the PLATE Component GUIDE-ROD Assembly - Mate the PLATE Component GUIDE-ROD Assembly - Mate Errors Collision Detection Modify Component Dimension SOLIDWORKS Design Library	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-16 3-17 3-18 3-18 3-20 3-22 3-27 3-29 3-30 3-31
Questions Project 3 - Fundamentals of Assembly Modeling Project Objective Project Situation Project Overview Assembly Modeling Approach Linear Motion and Rotational Motion GUIDE-ROD assembly GUIDE-ROD assembly - Insert Components FeatureManager Syntax Mate Types Standard Mates Advanced Mates Mechanical Mates Quick Mate GUIDE-ROD Assembly - Mate the ROD Component GUIDE-ROD Assembly - Mate the PLATE Component GUIDE-ROD Assembly - Mate Errors Collision Detection Modify Component Dimension	2-89 3-1 3-3 3-4 3-5 3-5 3-6 3-7 3-11 3-13 3-16 3-16 3-16 3-16 3-17 3-18 3-18 3-20 3-22 3-27 3-29 3-30

Survey of Martine	2 1 1
SmartMates	3-44
Coincident/Concentric SmartMate	3-45
Tolerance and Fit	3-47
1	3-51
	3-56
	3-58
Save As Copy Option	3-59
Save as	3-59
Save as copy and continue	3-59
Save as copy and open	3-59
	3-62
	3-62
1	3-64
	3-66
	3-72
	3-74
	3-76
	3-77
Questions	5-77
Project 4 - Fundamentals of Drawing	4-1
Project Objective	4-3
Project Situation	4-4
	4-4
	4-5
	4-12
	4-17
	4-18
	4-22
	4-23
e	4-26
1	4-29
	4-30
	4-30 4-31
	4-31
	4-33
	4-35
e	4-37
	4-40
Move Dimensions to a Different View	4-44
Dimension Holes and the Hole Callout	4-45
Center Marks and Centerlines	4-48
	4-50
GUIDE Part-Insert an Additional Feature	4-54
General Notes and Parametric Notes	4-56
Revision Table	4-59
Part Number and Document Properties	4-61
Exploded View	4-67
Balloons	4-69
Bill of Materials	4-71
Insert a Center of Mass Point into a drawing	4-77
Project Summary	4-79

Questions

4-79

Project 5 - Extrude and Revolve Features	5-1
Project Objective	5-3
Project Overview	5-4
Design Intent	5-6
Project Situation	5-9
Part Template	5-11
BATTERY Part	5-15
BATTERY Part - Extruded Boss/Base Feature	5-17
BATTERY Part - Fillet Feature Edge	5-21
BATTERY Part - Extruded Cut Feature	5-23
BATTERY Part - Fillet Feature	5-25
BATTERY Part - Extruded Boss/Boss Feature	5-26
Injection Molded Process	5-32
BATTERYPLATE Part	5-33
Save As, Delete, Edit Feature and Modify	5-34
BATTERYPLATE Part - Extruded Boss/Base Feature	5-36
BATTERYPLATE Part - Fillet Features: Full Round and Multiple Radius Options	5-37
Multi-body Parts and the Extruded Boss/Base Feature	5-40
LENS Part	5-42
LENS Part-Revolved Base Feature	5-43
LENS Part-Shell Feature	5-46
Extruded Boss/Base Feature and Convert Entities Sketch tool	5-47
LENS Part-Hole Wizard	5-48
LENS Part - Revolved Boss Thin Feature	5-50
LENS Part - Extruded Boss/Boss Feature and Offset Entities	5-52
LENS Part - Extruded Boss/Boss Feature and Transparency	5-54
BULB Part	5-56
BULB Part - Revolved Base Feature	5-57
BULB Part - Revolved Boss Feature and Spline Sketch tool	5-60
BULB Part - Revolved Cut Thin Feature	5-61
BULB Part - Dome Feature	5-63
BULB Part - Circular Pattern Feature	5-64
Customizing Toolbars and Short Cut Keys	5-68
Design Checklist and Goals before Plastic Manufacturing	5-70
Mold Base	5-72
Applying SOLIDWORKS Features for Mold Tooling Design	5-72
Manufacturing Design Issues	5-82
Project Summary	5-83
Questions	5-84
Questions	5 01
Project 6 - Swept, Lofted and Additional Features	6-1
Project Objective	6-3
Project Overview	6-4
Project Situation	6-5
O-RING Part - Swept Base Feature	6-7
O-RING Part - Design Table	6-8
SWITCH Part - Lofted Base Feature	6-12
SWITCH Part - Dome Feature	6-17
Four Major Categories of Solid Features	6-19

LENSCAP Part	6-19
LENSCAP Part - Extruded Boss/Base, Extruded Cut and Shell Features	6-20
LENSCAP Part - Revolved Thin Cut Feature	6-23
LENSCAP Part - Thread, Swept Feature and Helix/Spiral Curve	6-24
HOUSING Part	6-30
HOUSING Part - Lofted Boss Feature	6-33
HOUSING Part - Second Extruded Boss/Base Feature	6-37
HOUSING Part - Shell Feature	6-38
HOUSING Part - Third Extruded Boss/Base Feature	6-39
HOUSING Part - Draft Feature	6-40
HOUSING Part - Thread with Swept Feature	6-42
HOUSING Part - Handle with Swept Feature	6-47
HOUSING Part - Extruded Cut Feature with Up To Surface	6-52
HOUSING Part - First Rib and Linear Pattern Feature	6-54
HOUSING Part - Second Rib Feature	6-57
HOUSING Part - Mirror Feature	6-60
FLASHLIGHT Assembly	6-63
Assembly Template	6-64
LENSANDBULB Sub-assembly	6-64
BATTERYANDPLATE Sub-assembly	6-69
CAPANDLENS Sub-assembly	6-71
FLASHLIGHT Assembly	6-75
Addressing Interference Issues	6-81
Export Files and eDrawings	6-82
Project Summary	6-85
Questions/Exercises	6-86
Project 7 - Top-Down Assembly Modeling and Sheet Metal	7-1
Project Objective	7-3
Project Objective Project Situation	7-3 7-4
Project Objective Project Situation Top-Down Assembly Modeling	7-3 7-4 7-5
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview	7-3 7-4 7-5 7-8
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features	7-3 7-4 7-5 7-8 7-10
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template	7-3 7-4 7-5 7-8 7-10 7-12
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch	7-3 7-4 7-5 7-8 7-10 7-12 7-13
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations	7-3 7-4 7-5 7-8 7-10 7-12 7-13 7-17
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component	7-3 7-4 7-5 7-8 7-10 7-12 7-13 7-17 7-22
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component	7-3 7-4 7-5 7-8 7-10 7-12 7-13 7-17 7-22 7-28
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview	7-3 7-4 7-5 7-8 7-10 7-12 7-13 7-17 7-22 7-28 7-34
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends	7-3 7-4 7-5 7-8 7-10 7-12 7-13 7-17 7-22 7-28 7-34 7-34
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief	7-3 7-4 7-5 7-8 7-10 7-12 7-13 7-17 7-22 7-28 7-28 7-34 7-34 7-37
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component	$\begin{array}{c} 7-3 \\ 7-4 \\ 7-5 \\ 7-8 \\ 7-10 \\ 7-12 \\ 7-13 \\ 7-17 \\ 7-22 \\ 7-28 \\ 7-34 \\ 7-34 \\ 7-37 \\ 7-37 \end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends	$\begin{array}{c} 7-3 \\ 7-4 \\ 7-5 \\ 7-8 \\ 7-10 \\ 7-12 \\ 7-13 \\ 7-17 \\ 7-22 \\ 7-28 \\ 7-34 \\ 7-34 \\ 7-37 \\ 7-37 \\ 7-40 \end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Rip Feature and Sheet Metal Bends CABINET - Edge Flange	$\begin{array}{c} 7-3 \\ 7-4 \\ 7-5 \\ 7-8 \\ 7-10 \\ 7-12 \\ 7-13 \\ 7-17 \\ 7-22 \\ 7-28 \\ 7-34 \\ 7-34 \\ 7-37 \\ 7-37 \\ 7-40 \\ 7-42 \end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Edge Flange CABINET - Hole Wizard and Linear Pattern Features	$\begin{array}{c} 7-3\\ 7-4\\ 7-5\\ 7-8\\ 7-10\\ 7-12\\ 7-13\\ 7-17\\ 7-22\\ 7-28\\ 7-34\\ 7-34\\ 7-34\\ 7-37\\ 7-40\\ 7-42\\ 7-45\end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Edge Flange CABINET - Hole Wizard and Linear Pattern Features CABINET - Sheetmetal Design Library Feature	$\begin{array}{c} 7-3\\ 7-4\\ 7-5\\ 7-8\\ 7-10\\ 7-12\\ 7-13\\ 7-17\\ 7-22\\ 7-28\\ 7-34\\ 7-34\\ 7-34\\ 7-37\\ 7-37\\ 7-40\\ 7-42\\ 7-45\\ 7-49\end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Rip Feature and Sheet Metal Bends CABINET - Hole Wizard and Linear Pattern Features CABINET - Sheetmetal Design Library Feature CABINET - Louver Forming tool	$\begin{array}{c} 7-3\\ 7-4\\ 7-5\\ 7-8\\ 7-10\\ 7-12\\ 7-13\\ 7-17\\ 7-22\\ 7-28\\ 7-34\\ 7-34\\ 7-34\\ 7-37\\ 7-37\\ 7-40\\ 7-42\\ 7-45\\ 7-49\\ 7-53\end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Rip Feature and Sheet Metal Bends CABINET - Hole Wizard and Linear Pattern Features CABINET - Hole Wizard and Linear Pattern Features CABINET - Sheetmetal Design Library Feature CABINET - Louver Forming tool Manufacturing Considerations	$\begin{array}{c} 7-3\\ 7-4\\ 7-5\\ 7-8\\ 7-10\\ 7-12\\ 7-13\\ 7-17\\ 7-22\\ 7-28\\ 7-34\\ 7-34\\ 7-37\\ 7-37\\ 7-37\\ 7-40\\ 7-42\\ 7-45\\ 7-49\\ 7-53\\ 7-54\\ \end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Edge Flange CABINET - Hole Wizard and Linear Pattern Features CABINET - Sheetmetal Design Library Feature CABINET - Louver Forming tool Manufacturing Considerations Additional Pattern Options	$\begin{array}{c} 7-3\\ 7-4\\ 7-5\\ 7-8\\ 7-10\\ 7-12\\ 7-13\\ 7-17\\ 7-22\\ 7-28\\ 7-34\\ 7-34\\ 7-37\\ 7-37\\ 7-37\\ 7-40\\ 7-42\\ 7-45\\ 7-49\\ 7-53\\ 7-54\\ 7-60\end{array}$
Project Objective Project Situation Top-Down Assembly Modeling BOX Assembly Overview InPlace Mates and In-Context features Part Template and Assembly Template Box Assembly and Layout Sketch Global Variables and Equations MOTHERBOARD - Insert Component POWERSUPPLY - Insert Component Sheet Metal Overview Bends Relief CABINET - Insert Component CABINET - Insert Component CABINET - Rip Feature and Sheet Metal Bends CABINET - Rip Feature and Sheet Metal Bends CABINET - Hole Wizard and Linear Pattern Features CABINET - Hole Wizard and Linear Pattern Features CABINET - Sheetmetal Design Library Feature CABINET - Louver Forming tool Manufacturing Considerations	$\begin{array}{c} 7-3\\ 7-4\\ 7-5\\ 7-8\\ 7-10\\ 7-12\\ 7-13\\ 7-17\\ 7-22\\ 7-28\\ 7-34\\ 7-34\\ 7-37\\ 7-37\\ 7-37\\ 7-40\\ 7-42\\ 7-45\\ 7-49\\ 7-53\\ 7-54\\ \end{array}$

PEM Fasteners and IGES Components	7-70
Pattern Driven Component Pattern	7-74
MOTHERBOARD - Assembly Hole Feature	7-76
Assembly FeatureManager and External References	7-77
Replace Components	7-79
Equations	7-82
Design Tables	7-86
BRACKET Part - Sheet Metal Features	7-89
BRACKET Part - In-Content Features	7-91
BRACKET Part - Edge, Tab, Break Corner and Miter Flange Features	7-93
BRACKET Part - Mirror Component	7-98
MirrorBRACKET Part - Bends, Fold, Unfold and Jog Features	7-101
Project Summary	7-106
Questions	7-107
Project 8 - SOLIDWORKS Simulation	8-1
Chapter Objective	8-1
Finite Element Modeling	8-1
Introduction	8-1
CSWA-S Audience	8-3
Basic CSWA-S Concepts	8-5
Simulation Advisor	8-6
Simulation Help & Tutorials	8-7
Linear Static Analysis	8-8
General Procedure to Perform a Linear Static Analysis	8-10
Sequence of Calculations in General	8-12
Stress Calculations in General	8-12
Overview of the Yield or Inflection Point in a Stress-Strain Curve	8-12
Material Properties in General	8-13
Connections in General	8-14
Restraint Types	8-14
Loads and Restraints in General	8-16
Meshing in General	8-17
Meshing Types	8-18
SOLIDWORKS Simulation meshing Tips	8-21
Running the Study	8-23
Displacement Plot - Output of Linear Static Analysis	8-23
Adaptive Methods for Static Studies	8-24
Sample Exam Questions	8-25
FEA Modeling Section	8-35
Tutorial FEA Model 8-1	8-35
Tutorial FEA Model 8-2	8-42
Tutorial FEA Model 8-3	8-49
Tutorial FEA Model 8-4	8-53
Tutorial FEA Model 8-4 Part 2	8-58
Tutorial FEA Model 8-4 Part 3	8-59

Project 9 - SOLIDWORKS and the 3DEXPERIENCE Platform	9-1
Project Objective	9-3
3D EXPERIENCE Platform	9-4
New Save Tools	9-4
New Open Tools	9-6
Revision	9-7
Modification date	9-7
Creation date	9-7
Owner name	9-7
Maturity state	9-7
Lock state	9-7
UnLock state	9-7
Bookmark Workspace	9-7
Overwrite Protection	9-8
Private	9-8
In Work	9-8
Frozen	9-8
Released	9-8
Obsolete	9-8
Complex Model Relations	9-10
Auto Generated Embedded Model Properties	9-11
Handling Revisions	9-11
Storage Space	9-12
3DDrive	9-12
Auto-Synched to Windows Explorer	9-12
3D EXPERIENCE Platform Search Tools	9-13
Metadata	9-14
6W Tags	9-14
3DPlay	9-14
Sharing of Links	9-14
3DSwym	9-15
3D EXPERIENCE Lesson 1	9-16
Getting Started with SOLIDWORKS and the Platform	9-16
3D EXPERIENCE Lesson 2	9-26
SOLIDWORKS Save and Revision	9-26
3D EXPERIENCE Lesson 4	9-38
SOLIDWORKS and Lifecycle Maturity States	9-38
Exclusive Bonus Content - Instructions for download on inside front cover of book	
Project 10 - Additive Manufacturing - 3D Printing Fundamentals	10-1
Project Objective	10-3
Additive vs. Subtractive Manufacturing	10-4
3D Printer Technology	10-5
Stages of 3D Printing	10-5
Fused Filament Fabrication (FFF)	10-6
StereoLithography (SLA)	10-9
Selective Laser Sintering (SLS)	10-11
Select the Correct Filament Material for FFF	10-12
PLA (Polylactic Acid)	10-12
Flex/Soft PLA	10-13
PLA Storage	10-14
-	

PLA Part Accuracy	10-14
ABS (Acrylonitrile-Butadiene-Styrene)	10-14
ABS Storage	10-15
ABS Part Accuracy	10-15
Nylon	10-16
Nylon 618	10-16
Nylon 645	10-16
Nylon Storage	10-17
Nylon Accuracy	10-17
PVA (Polyvinyl Alcohol)	10-17
STereoLithography (*.stl) file	10-18
Save an STL (*stl) file	10-18
Additive Manufacturing (*amf) file	10-19
Save an Additive Manufacturing (*amf) file	10-19
3D Manufacturing Format (*.3mf) file	10-20
Save a 3D Manufacturing Format (*.3mf) file	10-20
What is a Slicer?	10-20
How does a Slicer Work?	10-21
Slicer Parameters	10-21
Layer Height	10-21
Shell (Wall) Thickness	10-21
Infill Density/Overlap	10-22
Infill Patterns	10-22
Print Speed	10-22
Support Types	10-23
Touching Buildplate	10-23
Everywhere	10-23
Bed Platform Adhesion	10-24
Raft	10-24
Skirt	10-24
Brim	10-24
Part Orientation	
	10-25
Example 1	10-25 10-26
Example 2	
Optimize Print Direction	10-26
Thin Region	10-26
Area of Overhang	10-26
Amount of needed Support Remove Model from the Build Plate	10-26
	10-28
Non-heated Build Plate	10-28
Heated Build Plate	10-28
Know the Printer's Limitations	10-29
Tolerance for Interlocking Parts	10-29
General Printing Tips	10-29
Reduce Infill/Overlap	10-29
Control Build Area Temperature	10-30
Add Pads	10-31
Safe Zone Rule	10-31
First Layer Not Sticking	10-31
Level Build Platform	10-32
Minimize Internal Support	10-32

Design a Water Tight Mesh Clearance	10-32 10-32
In General SOLIDWORKS Additive Manufacturing Certification (CSWA-AM) Summary	10-33 10-34 10-35
Project 11 - Certified SOLIDWORKS Associate - Mechanical Design Exam (CSWA)	11-1
Introduction	11-3
Taking the Exam (Segment 1 or 2)	11-4
Part 1 of the Exam	11-5
Basic Part Creation and Modification, Intermediate Part Creation and Modification	11-5
Assembly Creation and Modification	11-7
Part 2 of the Exam	11-8
Introduction and Drafting Competencies	11-8
Advanced Part Creating and Modification	11-9
Assembly Creation and Modification	11-10
Intended Audience	11-11
During the Exam	11-12
Drafting Competencies	11-13
Example 1	11-13
Example 2	11-13
Example 3	11-14
Example 4	11-14
Example 5	11-14
Example 6	11-14
Basic Part Creation and Modification, Intermediate Part Creation and Modification	11-15
Example 1	11-16
Example 2	11-17
Example 3	11-18
Example 4	11-19
Example 5	11-20
Example 6	11-21
Example 6A	11-23
Example 6B	11-23
Advanced Part Creation and Modification	11-24
Example 1	11-24
Example 2	11-26
Example 3	11-27
Example 4	11-28
Example 5	11-29
Example 6	11-31
Example 6A	11-32
Assembly Creation and Modification	11-33
Example 1	11-34

Appendix	A-1
SOLIDWORKS Keyboard Shortcuts	A-1
Modeling - Best Practices	A-3
Helpful On-Line information	A-5
SOLIDWORKS Document types	A-6
Project 8: Answer key	A-7
Glossary	G-1
Index	I-1