

SolidWorks 2012

Course outline

The following is an outline for most of the SolidWorks training courses offered by CADimensions. All courses consist of lectures and case studies demonstrated by the instructor. Students are given lab exercises that reinforce the topics covered. Training manuals will be supplied to each student. Computers are provided by CADimensions unless other arrangements have been made, such as on-site training.

Near the end of this document, we provide help in determining which SolidWorks course is right for you. Generally speaking, most people should take the SolidWorks Essentials training along with SolidWorks Advanced in order to reap the most benefit from the software. Your needs may vary.

Essentials

Morning

Lesson 1

Introductions, course outline, SolidWorks overview, user interface, menu customization options, toolbars, understanding system feedback.

Lesson 2

Introduction to sketching, basic feature terminology, adding and removing geometric relations, sketch states, various sketch entities, dimensions, design intent, extrusions.

Afternoon

Lesson 3

Basic modeling, terminology, profile and plane selection, hiding and showing planes, changing views, applying fillets, display options, hole wizard, model appearance and color options.

Basic 3 view drawings, drawing settings, inserting dimensions, DimXpert, drawing associativity, hole callouts, center marks, basic annotations.

Day 2

Morning

Lesson 4

Creating draft, trimming and extending, mirroring sketch geometry, extrude end conditions, display options, converting and offsetting entities, copying and pasting features, measure tool, editing a sketch, the Select Other command.

Lesson 5

Linear and circular feature patterns, axes, mirroring features, understanding faces and bodies and patterning these objects, sketch driven patterns.

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Afternoon

Lesson 6

Revolved features, slots, introduction to multiple bodies, basic swept features, chamfers, appearances and scenes, RealView graphics, custom properties. Applying materials, mass properties; SimulationXpress stress analysis, basic FEA theory, optimization and engineering design changes.

Day 3

Morning

Lesson 7

Thin walled parts, shell command, analyzing draft, applying draft as a feature, user defined planes, rib command, thin features.

Lesson 8

Part error recognition and diagnostics, basic repair techniques, Repair Sketch command, sketch editing, using the FilletXpert and DraftXpert.

Afternoon

Lesson 9

Part editing, design changes, editing a sketch plane, SketchXpert, over defined sketches, shared sketches, sketch contours, section views, using Instant 3D.

Day 4

Morning

Lesson 10

Configurations, how they are used, creating configurations, using Configure Dimension/Feature, global variables, equations, the Design Library.

Afternoon

Lesson 11

Detailing drawings, section and detail views, annotations, view alignment, model views, broken views, tangent edges, projected views, multiple sheet drawings, moving and copying views, title block automation.

Day 5

Morning

Lesson 12

Bottom up assembly modeling, inserting components, moving and rotating components, mate relationships, SmartMates, alignment conditions, hiding and transparency, sub-assemblies, assembly motion, pack and go functionality.

Afternoon

Lesson 13

Interference detection, physical dynamics, collision detection, assembly editing, mass properties, exploded views and explode lines, assemblies in drawings, bill of materials, balloons, customizing BOM's. Going through the Options settings, creating templates.

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Drawings

- Morning**
- Lesson 1 Preparation to creating successful drawings, establishing named views, drawing sheets and formats, setting global drawing options, drawing sheet setup, overview of various view types, drawing view activation, edge display and display options, hiding views, copying and moving views, view alignment and rotation, center marks and centerlines.
- Lesson 2 Model items versus reference dimensions, inserting dimensions, moving dimensions and item snapping, hiding and showing annotations, aligning dimensions, dimension properties, tolerance and precision options, dimension favorites.
- Afternoon**
- Lesson 3 Annotation types and styles, parametric notes, datum feature symbols, geometric tolerancing, blocks.
- Lesson 4 Customizing sheet formats, custom properties, saving templates, inserting OLE objects and logos, BOM anchor points, predefined views, defining title blocks, imported sheet formats, importing DWG or DXF files, using DraftSight for legacy data.

Day 2

- Morning**
- Lesson 5 Assembly specific views, auto hatching, alternate position view, broken out section views, exploded views, hiding components in specific views, using display states in views.
- Lesson 6 Customizing a bill of materials (BOM), modifying BOM templates, modifying custom properties to reflect in a BOM, tabulated drawings, controlling BOM part numbers, design tables in drawings.
- Lesson 7 Large assembly drawing performance issues, lightweight drawings, detached drawings, display issues caused by interference.
- Afternoon**
- Lesson 8 Reusing drawing files, changing file references in drawings. Generating eDrawings from parts, assemblies and drawings, manipulating views, animations, cross sections, using mark-up, saving as executables.
- Lesson 9 Using the DimXpert, tolerance types and features, annotation views, performing a tolerance analysis.

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Advanced Part Modeling

Morning

Lesson 1 Splines: the anatomy of splines, sketching with splines, curvature combs, Sketch Picture.

Lesson 2 Multibody solids: multibody techniques, Feature Scope, patterning bodies, move/copy bodies, combining bodies.

Afternoon

Lesson 3 Uses of multibodies, common bodies, the Indent feature, Local operations, modeling negative space, creating multibodies, creating parts and assemblies from multibodies, the Split command.

Lesson 4 Sweeping: introduction to sweeping, sweep with guide curves, sweep options.

Day 2

Morning

Lesson 5 Working with curves: 3D sketching, sweeping along a 3D path, Helix and Spiral command, Projected Curve command, Composite Curve command, Fit Spline command, projecting sketches.

Lesson 6 Advanced Sweeping: Orientation and twist controls; Follow path, Keep normal constant, Twist and Guide Curves, Twist along Path. Align with end faces, Sweeping along model edges.

Afternoon

Lesson 7 Lofts: Lofting and Sweeping – what’s the difference? Basic lofting, stages in the process, merge tangent faces, start and end constraints, using a 3D sketch to loft, using Derived and Copied sketches.

Lesson 8 Other Advanced Tools: Advanced fillets; setback, face and variable fillets. Analyzing geometry, curvature display, Zebra Stripes, Intersection Curves, Wrap feature, Deform feature, Knit Surface, Move and Delete Face command.

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Advanced Assembly Modeling

Morning

Lesson 1

Top down assembly modeling, in context features, in context part creation, hole series through components, Smart Fasteners, locking and breaking external references, editing broken external references, internal versus external components.

Afternoon

Lesson 2

Assembly features and smart fasteners. Hole series, time-dependent features, fastener defaults, settings, hole series components, making changes to fasteners.

Day 2

Morning

Lesson 3

Advanced mates, mate capabilities, design library, mate references, smart components, smart features, advanced and mechanical mates. Inserting and mating components, multiple mate mode, copy with mates, mate options.

Lesson 4

Using configurations with assemblies, stages in the process, component patterns, configuration properties, manually creating configurations, configuration publisher.

Afternoon

Lesson 5

Display states and appearances, display pane, adding, renaming, copying, and linked display states. Envelopes, advanced select, appearances, scenes, materials, and textures. RealView Graphics.

Day 3

Morning

Lesson 6

Assembly editing, design changes, repairing problems, information from an assembly, converting and replacing parts and assemblies. Troubleshooting assemblies, mate errors, over defined mates, MateXpert. Mirroring components, hole alignment, sensors, linked values, and creating assembly equations.

Lesson 7

Layout based assembly design, creating and using blocks, mechanical motion in blocks.

Afternoon

Lesson 8

Working with large assemblies, lightweight components, best practices, large assembly mode, using Quick View and SpeedPak, defeature, configurations in large assemblies, assembly visualization, drawing considerations.

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Sheet Metal

- Lesson 1 **Morning**
Sheet metal methods, creating a base flange, sheet metal gauges, parameters, bend allowance types, reliefs, flat patterns, edge flanges, adding cuts, corner breaks, sheet metal parts in drawings.
- Lesson 2 Sheet metal conversion topics, imported geometry, using the rip feature, making design changes, adding a welded corner.
- Lesson 3 **Afternoon**
Multi-body sheet metal parts, miter flanges, cut-list folder, using multi-bodies, patterning bodies, sheet metal properties, multi-body drawings, dxf/dwg.

Day 2

- Lesson 4 **Morning**
Sheet metal forming tools, types, creating them.
- Lesson 5 **Afternoon**
Sheet metal features and techniques, additional modeling techniques, in-context methods, process plans.

Mold Design

- Lesson 1 **Morning**
Core and Cavity design. Using the Mold Design toolbar, diagnosing errors in imported geometry, draft analysis, scaling, creating parting lines and shut off surfaces, parting surfaces, automated creation of interlock surfaces.
- Lesson 2 Multiple Parting Directions. Utilizing undercut analysis, create side cores, lifters, and core pins; create an EDM electrode using the cavity body, utilizing multi-body tools
- Lesson 3 **Afternoon**
Importing and Repairing Geometry. Understanding the issues and factors that affect importing, the importing process, diagnose and repair problems with imported geometry, understand the relationships between surface and solid models, repair and edit imported geometry using surface modeling techniques.

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Lesson 4

Parting Lines and Shut-Off Surfaces. Understand the two types of shut-off surfaces, create shut-offs manually, using a parting line to split a solid body, utilizing selection tools in the mold design process.

Day 2

Lesson 5

Morning

Repairs and Surfaces. Repair undrafted faces, ruled surfaces, turning a surface model into a solid, create complex shut-off surfaces, create interlock surfaces, lofted surfaces.

Lesson 6

Using Surfaces. More shut-off surfaces manually create parting lines and parting surfaces, tooling splits.

Lesson 7

Reusable Data. The Design Library, library features, Smart Components, 3DContentCentral.

Afternoon

Lesson 8

Alternate Methods for Mold Design. Using alternate methods to create mold tooling, create a cavity in both bodies and parts, create surfaces required for molds, and create a mold half from surfaces.

Lesson 9

Making a Complete Mold. Add the mold inserts into a mold base, connect side cores and lifters to the mold base, use library features to create runners and gates, import surfaces to cut the ejector pins.

Advanced Surface Modeling

Lesson 1

Morning

Understanding surface modeling terms and basic concepts, surfaces versus solids, surface types, getting started with complex shapes.

Lesson 2

Introduction to surfacing, extruding, revolving, and sweeping surfaces, trimming and knitting, surface filleting guidelines, thickening into solids.

Lesson 3

Afternoon

Hybrid modeling, using surfaces to modify solids, surface and solid interchangeability, surfaces as construction geometry, performance considerations of various modeling techniques.

Lesson 4

Importing and diagnosing problem geometry, automatic and manual repair techniques.

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Day 2

- Lesson 5 **Morning**
Advanced surface modeling techniques, using images to capture design intent, effective use of splines, ruled surfaces, replacing faces.
- Lesson 6 **Afternoon**
Complex surface blends, trimming as preparation to blending, Wrap command as a surface tool, boundary surfaces, effective use of curvature combs and zebra stripes, freeform features, corner blends, problematic fillets.
- Lesson 7 *(Optional, time permitting.)* Using master part files to generate multiple models, master modeling techniques with molded assemblies, fastening features, SolidWorks Explorer.

SolidWorks Routing: Piping and Tubing

- Lesson 1 **Morning**
Fundamentals of Routing, types of routes, external vs. virtual files, virtual components, and routing setup.
- Lesson 2 Piping routes, route sketch, piping components, routing templates, auto route, editing a route, fittings, drag and drop components, creating custom components, interferences and clearances.
- Lesson 3 **Afternoon**
Tubing routes, terminal and in-line components, flexible and orthogonal tubing, bend and spline errors, route properties, tubing drawings.
- Lesson 4 Piping and tubing changes, weld gaps, pipe penetrations, flange to flange connections, copying routes, editing piping routes, piping drawings.

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- Lesson 5 **Morning**
Routing library parts, creating a library, pipe and tube parts, fitting parts, connection and routing points, elbows, multi-body components, assembly fittings.

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Lesson 6 Piping and instrumentation (P&ID) files, pipe systems, XML files, piping and instrumentation tab, P&ID report, pipe with multiple lines, pipes with in-line fittings, process drawings.

Afternoon

Lesson 7 Piping skids, Grid System feature, weldments, “walk through” animations, avatar paths.

Lesson 8 Using SolidWorks content, custom library naming, creating a routing settings file, virtual clips.

SolidWorks Routing: Electrical

Morning

Lesson 1 Introduction, what is routing, types of routes, external vs. virtual files, virtual components, routing setup, general routing settings.

Lesson 2 Basic electrical routing, adding routing components, drag and drop connectors, auto route, saving to an external file.

Lesson 3 Routing with clips, adding clips while auto routing, editing a route, working with clips, splitting a route, adding bends.

Afternoon

Lesson 4 Routing library parts, electrical parts, ribbon cable, conduits, component wizard, creating connectors and clips, cable, component and covering libraries, from/to list.

Lesson 5 Using standard cables, excel files, modifying and creating a standard cable, routing templates.

Day 2

Morning

Lesson 6 Importing data, data types, routing library manager, route properties, route guidelines, repair and re-route.

Lesson 7 Electrical drawings, route flattening and detailing, tables, connectors, flatten route, drawing details, wire lengths.

Afternoon

Lesson 8 Electrical ribbon cables, ribbon cable components; connectors, sockets, clips, cables, auto routing ribbon cables, flexible and folded ribbon cables.

Lesson 9 Electrical conduits, rigid and flexible conduits, electrical conduit route properties, orthogonal routing, electrical data in conduits, electrical conduit BOM.

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Additional classes include:

- SolidWorks Workgroup (Contributor, CAD Editor and Administrator)
- SolidWorks Enterprise (Contributor, CAD Editor and Administrator)
- SolidWorks API Fundamentals
- SolidWorks Simulation
- SolidWorks Simulation Professional
- SolidWorks Motion
- SolidWorks Simulation Dynamics
- SolidWorks Simulation Non-linear
- SolidWorks Simulation Flow
- 3DVia Composer Essentials

Please contact your CADimensions sales rep for further assistance in attending one of these training classes.

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What Course Is Right For You?

SolidWorks Essentials – For those who wish to have a good fundamental understanding of SolidWorks. Covers all the basics, from part modeling, creating assemblies, and general design drawings and detailing. Weighted towards part design.

Drawings – This 2 day class is geared towards the drafter who will not be designing models and takes an in depth look at detailed drawings and annotations. No modeling is covered, nor is SolidWorks Essentials a prerequisite for this class. Generally speaking, most students attending the Essentials course will not require the Drawings course.

SolidWorks Advanced – For those going beyond basics, this class consists of 5 days of advanced part and assembly modeling. Got a model or assembly you think SolidWorks can do but you're not sure how to get there? The Advanced class is probably for you. SolidWorks Essentials is required prior to taking advanced training.

Sheet Metal – This 2 day class covers all aspects of sheet metal design in SolidWorks, including creating in-context sheet metal parts within an assembly. SolidWorks Essentials is required prior to taking this class.

Mold Design – The title says it all; this one day class covers 4 lessons that revolve around the creation of molds within SolidWorks.

Advanced Surface Modeling – A 2 day course will show advanced users how to best create advanced shapes using surfaces, splines, and a variety of advanced techniques.

SolidWorks File Management – This one day class will help to answer many common file management questions. Those working in a networked environment and sharing files will find this class especially valuable.

SolidWorks Workgroup – There are three Workgroup classes that can be taken, depending on your level of access. One class benefits the user strictly viewing the document vault or using the stand-alone versus the SolidWorks client. A second class covers everything a SolidWorks user will need to work successfully with Workgroup. Finally, a third class discusses what a system administrator must know to properly maintain and configure the Workgroup vault.

SolidWorks Enterprise – Similar to Workgroup, this class comes in three varieties. Your CADimensions Application Engineer or Sales Rep will be able to help you configure a class based on your needs.

API Fundamentals – For those wishing to expand the functionality of SolidWorks by writing their own Visual Basic routines, this class is for you. SolidWorks Essentials, or a good basic understanding of the SolidWorks software, along with prior programming experience, is required prior to taking this class.

SolidWorks Routing – The Routing class will teach students how to successfully define routes for use with piping, tubing and electrical designs. Also included are lessons on creating custom fittings, as well as wire harness creation and nail board layouts.

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Attending Class?

Note taking is strongly urged. Refreshments are provided when training is at CADimensions. A typical day begins at 8:30AM, lunch is from 12-1, and class is usually dismissed no later than 4:30PM. Students are responsible for their own lunch.

CADimensions, Inc. realizes how difficult it can be to send employees to training for extended periods. For this reason, we try to offer every course on a regular basis at our four main office locations (Buffalo, Rochester, East Syracuse and Albany). In this way, users can attend the Essentials course, have some time to absorb the material and use the software, then return at a later time to complete additional training.

Training certificates are issued to students completing any of our SolidWorks courses. The course attended will be distinguished on the certificate (i.e. - SolidWorks Advanced).

For those with specific training issues or require specialized topics, CADimensions, Inc., can offer assistance. Please contact your local CADimensions representative for more information, or to help set up a course.

Thank you for your continued support of our training programs!

Sincerely,

The Training Staff of CADimensions

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