

SolidWorks 2010

Course outline

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.

Lesson 3 cont.

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.

Corporate Headquarters

6310 Fly Road • East Syracuse, New York 13057
Phone: (315) 434-9787 • Fax: (315) 434-9782

Regional Offices

Albany • Phone: (518) 438-0647 • Fax: (518) 438-0761
Rochester • Phone: (585) 424-2570 • Fax: (585) 424-2342
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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.
- Lesson 6 con't 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, overdefined sketches, shared sketches, sketch contours, section views, using Instant 3D.

Day 4

Morning

- Lesson 10 Part configurations, manually creating configurations, suppressing and unsuppressing features, dimensional changes in specific configurations, using library features and creating features when multiple configurations are present.
- Lesson 11 Linking dimensions values, equations and variables, configuration specific properties, design tables, derived configurations, utilizing existing tables.

Afternoon

- Lesson 12 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 13 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.
- Lesson 14 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.

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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 the DWGEditor 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

- Lesson 1 **Morning**
Working with multiple bodies, bridging, local operations, combining bodies, inserting parts, patterning bodies, utilizing symmetry, feature scope, indent features, splitting parts, assemblies from bodies, modifying imported geometry.
- Lesson 2 Sweeping basics, working with the 3D Sketcher, utilizing sketch planes, composite curves, helical curves, modeling springs.
- Lesson 2 cont. **Afternoon**
Sweeping with guide curves, curve through x-y-z points, projected curves, variable radius fillets, viewing curvature, zebra stripes, multi thickness shells, modeling threads, twisted sweeps, sweep profile orientation and twist control, advanced guide curve options.

Day 2

- Lesson 3 **Morning**
Basic lofting, loft tangency conditions, derived sketches, advanced lofting techniques, loft centerlines, deviation analysis, working with splines, sketch pictures.
- Lesson 4 **Afternoon**
Fillet options, variable radius filleting techniques, setback fillets, face fillets, constant versus continuous curvature, utilizing hold lines, Wrap command, deforming faces, manipulating faces, using 3D sketches with the Hole Wizard.

Advanced Assembly Modeling

- Lesson 1 **Morning**
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.
- Lesson 2 **Afternoon**
Smart Mates and mate shortcuts, mate references, advanced mate types, custom PropertyManagers, Design Library Parts and Assemblies, Smart Components, using Auto Size, creating belts and chains, copying components with mates.

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Day 2

Morning

Lesson 3

Configurations within assemblies, controlling component suppression, component patterns, derived configurations, assembly design tables, AssemblyXpert (assembly statistics).

Lesson 4

Display states, display pane, selection tools, advanced select, envelopes, appearances, materials and scenes.

Afternoon

Lesson 5

Assembly features, feature scope, component replacement, replacing references, mate troubleshooting and repair, assembly dimensions and equations, mirroring components and sub-assemblies, MateXpert, hole alignment, sensors.

Day 3

Morning

Lesson 6

Layout-based assembly design, creating and inserting blocks, generating parts from blocks, saving blocks externally, unique block geometric relations.

Lesson 7

Working efficiently with large assemblies, overcoming missing components, flexible sub-assemblies, assembly reorganization and restructuring, large assembly mode, lightweight components, volume select, SpeedPak, SolidWorks Explorer, renaming components, where-used function.

Afternoon

Lesson 8

Using MotionManager, types of animations, understanding key points, animation wizard, physical dynamics, physical simulation, motors and motion, altering visual properties across the timeline, view orientation states.

Sheet Metal and Weldments

Morning (*Sheet Metal book*)

Lesson 1

Sheet metal features and parts, base flange command, editing bend parameters, bend tables and bend allowances, miter flanges, edge flanges, adding tabs, welding corners, corner trim, fold and unfold features, flat patterns in drawings.

Lesson 2

Forming tool usage and creation.

Afternoon

Lesson 3

Closing corners, hems, designing in the flat, sketched bends, breaking corners, jog features, mirroring features in sheet metal parts, utilizing symmetry, lofted bends, bend deviation.

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Lesson 4 Legacy parts and best practice techniques, importing IGES files, converting imported parts to sheet metal parts, Rip command, unrolling cylinders, utilizing configurations for process planning, Convert To Sheet Metal command in the context of an assembly.

Day 2

Lesson 1 **Morning** (*Weldments book*)
Weldments, structural members, trimming bodies, weld beads, gussets, end caps, cut lists, weldment drawings.

Lesson 2 Working with tubing, 3D sketcher, weldments and sheet metal in assemblies.

Mold Design

Lesson 1 **Morning**
Diagnosing errors in imported geometry, draft analysis, scaling, creating parting lines and shut off surfaces, parting surfaces, automated creation of interlock surfaces.

Lesson 2 Draft analysis and re-engineering of imported geometry, manual development of interlock surfaces, ruled and lofted surfaces, surface trimming and extending, planar surfaces, tooling split command.

Lesson 3 **Afternoon**
Multiple parting directions, undercut detection, creating side cores, lifters and core pins, modeling electrodes for EDM, manipulating faces.

Lesson 4 Alternative mold design methods, getting around problem areas, using combine and split techniques, manual surface development, knitting and solidifying.

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.

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Lesson 4 Importing and diagnosing problem geometry, automatic and manual repair techniques.

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

Lesson 1 **Morning**
Recommended settings, terms, understanding routes and the hardware and components that comprise them. Review of configurations, top down design practices, design tables, and the 3D Sketcher, if necessary.

Lesson 2 Basic electrical routing, placing connectors, editing wires, physical route geometry, applying electrical attributes, saving subassembly routes to external files.

Lesson 3 Routing with clips, adding to routes and auto-routing, editing clips, splitting routes, editing wires and electrical data paths.

Lesson 4 **Afternoon**
Using the routing component wizard, electrical libraries (cable and component libraries), from-to lists.

Lesson 5 Standard cable libraries, modifying standard cables, creating new standard cables and adding them to the library.

Lesson 6 Importing cable and connector data, cables versus wires, understanding from-to lists, from-to list wizard, route guidelines, using guidelines with clips, displaying electrical attributes.

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Day 2

- Morning**
- Lesson 7 Electrical drawings, flattening routes, harness board layouts and reports, part tables, circuit summaries, harness bill of materials, wire reports.
- Lesson 8 Electrical conduits, combining rigid pipe with electrical routes, adding hybrid components, editing wire libraries, circuit summaries.
- Lesson 9 Tubing routes, route points and connection points, error markers, envelope selection for checking interferences, exporting tube data, tube drawings.
- Afternoon**
- Lesson 10 Piping routes, piping supports and hangers, orthogonal routes, assembly fittings, removing pipes, pipe penetrations, adding unions and T's, custom fittings, coverings.
- Lesson 11 Piping and tubing changes, flange to flange connections, editing and adding to pipe routes, pipe drawings.
- Lesson 12 Using SolidWorks content, directory structure for SolidWorks content, creating a routing settings files.

SolidWorks File Management

- Morning**
- Lesson 1 File structure, file types, associativity between documents, file references, external references, legacy file conversion, understanding options when opening files, reloading files.
- Lesson 2 Saving copies of files, replacing references, the Save As Copy option, understanding custom properties.
- Afternoon**
- Lesson 3 External reference search order, copying and moving files, copying with references, in-context features, SolidWorks Explorer.
- Lesson 4 Working in a collaborative environment, sharing files, reloading, read-only access, multiple in-context references, support file management, setting paths, Toolbox configuration options, PhotoWorks support file paths, using SolidWorks Explorer for revision control.

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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
- 3DVia Composer Advanced

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 and Weldments – This 2 day class covers all aspects of sheet metal design in SolidWorks, including creating in-context sheet metal parts within an assembly. It also covers creating weldments of a structural and tubular nature. 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 9 AM, lunch is from 12-1, and class is usually dismissed no later than 4 PM. 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,

David Murray
CADimensions, Inc.
East Syracuse, NY 13057



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