



SolidWorks 3D Mechanical Design Course: Parts, Assemblies, Sheet Metal and Drawings



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Introduction:

SolidWorks 3D mechanical design covering parts, assemblies, sheet metal and drawings is a 5-day course for mechanical design and drafting teams that ends with a released Case Assembly Drawing Pack. Organisations lose time and material when models break after a dimension change, assemblies hide interferences and drawings reach the workshop without clear datums, tolerances or a reliable bill of materials. Nominees already produce parts or drawings in a 3D CAD tool and work hands on in software labs with every feature built live. CoreConcept Training Center delivers this SolidWorks 3D mechanical design course.

Course Objectives:

- Build fully defined sketches and parametric part models whose relations, equations and configurations preserve design intent through dimension changes
- Assemble multi-level mechanical assemblies with standard, advanced and mechanical mates and verify clearance with interference detection
- Produce engineering drawings with section and detail views, model dimensions, GD&T datums and feature control frames to ASME Y14.5 or ISO GPS, and indented bills of materials
- Model sheet metal parts with flat patterns and weldment frames with cut lists ready for fabrication
- Apply top-down in-context design and a first-pass SimulationXpress stress check while keeping external references and rebuild errors under control
- Organise design reuse through design library parts, standard fasteners and Pack and Go file handover

Target Audience:

- Mechanical design teams responsible for modelling machine parts, housings and frames for new equipment
 - Drafting and detailing teams responsible for issuing manufacturing drawings and bills of materials to workshops
 - Maintenance and plant engineering teams responsible for modifying equipment and preparing replacement part drawings
 - Fabrication and sheet metal engineering teams responsible for flat patterns, cut lists and welded frames
 - Product development teams responsible for configurable product families and design change updates
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Course Outline:

Day 1: SolidWorks Modelling Foundations, Sketch Relations and Design Intent

- SolidWorks Interface, FeatureManager Design Tree and Document Templates
- Sketch Relations and Smart Dimensions for Fully Defined Profiles
- Design Intent Planning with Origin, Reference Planes and Symmetry
- Extruded and Revolved Boss and Cut Base Features
- Current-State Audit of Legacy Models and Rebuild Errors

Day 2: Parametric Part Features, Equations and Configurations

- Hole Wizard, Fillet, Chamfer and Shell Feature Application
- Swept and Lofted Features for Ducts and Transitions
- Linear, Circular and Curve-Driven Patterns with Mirror Features
- Global Variables and Equations Linking Driving Dimensions
- Design Tables and Configurations for Standard Part Families

Day 3: Assemblies, Mates and Engineering Drawing Production

- Bottom-Up Assembly Structure with Subassemblies and Fixed Components
- Standard, Advanced and Mechanical Mates for Gear and Cam Motion
- Drawing Sheet Formats with Standard, Section and Detail Views
- GD&T Datums and Feature Control Frames per ASME Y14.5
- Indented Bill of Materials Tables with Balloons and Item Numbers

Day 4: Sheet Metal, Weldments, Top-Down Design and Model Robustness

- Sheet Metal Base Flange, Edge Flange and Bend Allowance
- Flat Pattern Output and Bend Notes for Fabrication Shops
- Weldment Structural Members, Corner Trims and Cut List Properties
- Top-Down In-Context Design with External Reference Control
- SimulationXpress First-Pass Stress Check on a Loaded Bracket

Day 5: Software Lab: Case Conveyor Drive Assembly and Drawing Pack

- Case Gearbox Housing and Shaft Parts Built from Configurations
 - Conveyor Drive Assembly Mates with Interference Detection Review
 - Sheet Metal Guard and Weldment Base Frame Integration
 - Design Library Parts, Standard Fasteners and Pack and Go Handover
 - Case Assembly Drawing Pack Completion and Peer Design Review
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Skills You Will Gain:

- Sketch Constraint Management
- Parametric Part Modelling
- Configuration and Equation Control
- Assembly Mating and Motion
- Interference and Clearance Checking
- Engineering Drawing Detailing
- Sheet Metal and Weldment Modelling
- CAD File and Reference Management

Why Attend This Course:

- Deliver a Case Assembly Drawing Pack, with part models, assembly, drawing sheets and bill of materials, to the engineering manager and the workshop or fabrication lead
- Decide whether a part belongs in a configuration family, an in-context reference or a separate file before building it
- Avoid scrapped parts, workshop queries and late interferences caused by under-defined sketches, missing datums and unchecked mates
- Pass on sketching conventions, drawing templates and the file handover routine to design and drafting colleagues

Conclusion:

Back at work, the participant hands the engineering manager and the workshop or fabrication lead a Case Assembly Drawing Pack that sets the modelling conventions, mate scheme, drawing template, GD&T callouts and bill of materials format the unit can adopt for its own equipment. Managers use it to approve a design standard for new parts, decide which product families move to configurations and release drawings with fewer workshop queries. After the first design change released under the new conventions, the unit should review rebuild errors, drawing revision queries and interference findings against the pack.

Frequently Asked Questions FAQ:

What should participants know before the SolidWorks 3D mechanical design course?

Participants should already read engineering drawings and have produced basic parts or sketches in a 3D CAD tool. Fluency in every SolidWorks command is not expected. Bringing a simple part drawing from their own equipment helps them apply the labs to familiar geometry.

How does SolidWorks 3D mechanical design differ from a finite element analysis or design for manufacture course?

It teaches the modelling, assembly and drawing workflow that produces the design itself. Simulation appears only as a first-pass stress check and manufacturing cost is not analysed. Analysis courses verify stresses in depth, and design for manufacture courses score and redesign assemblies for cost.

Why does design intent matter in SolidWorks 3D mechanical design?

Design intent decides how a model reacts when a dimension changes. Sketches fully defined by relations, features referenced to planes and dimensions linked by equations update predictably, while under-defined models break, shift holes or corrupt assemblies and drawings after a routine change.

What do participants take back from the SolidWorks 3D mechanical design course?

Participants take back a Case Assembly Drawing Pack with configured part models, a mated assembly checked for interference, sheet metal and weldment components, drawing sheets with GD&T callouts and an indented bill of materials, ready to adapt as a unit design standard.
