

# SOLIDWORKS Simulation Course

**LENGTH: 3 DAYS**

**Prerequisites:** Mechanical design experience; experience with the Windows® operating system.

**Description:** This course is designed to make SOLIDWORKS users productive more quickly with the SOLIDWORKS Simulation Bundle. This course will provide an in-depth coverage on the basics of Finite Element Analysis (FEA), covering the entire analysis process from meshing to evaluation of results for parts and assemblies. The class discusses linear stress analysis, gap/contact analysis, and best practices.



**Who Should Attend:** All SOLIDWORKS Simulation users wishing to create better designs in SOLIDWORKS by performing analysis and evaluating the behavior of their parts and assemblies under actual service conditions.

## Topics covered in this course are:

### Introduction

- About This Course
- What is SOLIDWORKS Simulation?
- What Is Finite Element Analysis?
- Build Mathematical Model
- Build Finite Element Model
- Solve Finite Element Model
- Analyze Result
- Errors in FEA
- Finite Elements
- Degrees of Freedom
- Calculations in FEA
- Interpretation of FEA Results
- Units of Measurement
- Limitations of SOLIDWORKS Simulation

### Lesson 1: The Analysis Process

- Objectives
- The Analysis Process
- Case Study: Stress in a Plate
- Project Description
- SOLIDWORKS Simulation Options
- Preprocessing
- Meshing
- Postprocessing
- Multiple Studies
- Reports

### Lesson 2: Mesh Controls, Stress Concentrations and Boundary Conditions

- Objectives
- Mesh Control
- Case Study: The L Bracket
- Project Description
- Case Study: Analysis of Bracket with a Fillet
- Case Study: Analysis of a Welded Bracket
- Understanding the Effect of Boundary Conditions

### Lesson 3: Assembly Analysis with Contacts

- Objectives
- Contact Analysis
- Case Study: Pliers with Global Contact
- Pliers with Local Contact

### Lesson 4: Symmetrical and Free Self-Equilibrated Assemblies

- Objectives
- Shrink Fit Parts
- Case Study: Shrink Fit
- Project Description
- Analysis with Soft Springs

### Lesson 5: Assembly Analysis with Connectors

- Objectives
- Connecting Components
- Connectors
- Mesh Control in an Assembly
- Case Study: Cardan Joint
- Problem Statement
- Part 1: Draft Quality Coarse Mesh Analysis
- Part 2: High Quality Mesh Analysis

### Lesson 6: Compatible/Incompatible Meshes

- Objectives
- Compatible / Incompatible Meshing
- Case Study: Rotor

### Lesson 7: Analysis of Thin Components

- Objectives
- Thin Components
- Case Study: Pulley
- Part 1: Mesh with Solid Elements
- Part 2: Refined Solid Mesh
- Solid vs. Shell
- Creating Shell Elements
- Part 3: Shell Elements - Mid-plane Surface
- Results Comparison
- Case Study: Joist Hanger



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**Training Registration**

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## Lesson 8: Mixed Meshing Shells & Solids

Objectives  
Mixed Meshing Solids and Shells  
Case Study: Pressure Vessel

## Lesson 9: Mixed Meshing Solids, Beams & Shells

Objectives  
Mixed Meshing  
Case Study: Particle Separator  
Beam imprint

## Lesson 10: Submodeling

Objectives  
Submodeling Basics  
Case Study: Scaffolding  
Part 1: Parent Study  
Part 2: Child Study

## Lesson 11: Design Study

Objectives  
Design Study  
Case Study: Suspension Design  
Part 1: Multiple Load Cases  
Part 2: Geometry Modification

## Lesson 12: Thermal Stress Analysis

Objectives  
Thermal Stress Analysis  
Case Study: Bimetallic Strip  
Examining Results in Local Coordinate Systems  
Saving Model in its Deformed Shape

## Lesson 13: Adaptive Meshing

Objectives  
Adaptive Meshing  
Case Study: Support Bracket  
h-Adaptivity Study  
p-Adaptivity Study  
h vs. p Elements - Summary

## Lesson 14: Large Displacement Analysis

Objectives  
Small vs. Large Displacement Analysis  
Case Study: Clamp  
Part 1: Small Displacement Linear Analysis  
Part 2: Large Displacement Nonlinear Analysis

## Appendix A: Meshing, Solvers, and Tips & Tricks

Meshing Strategies  
Geometry Preparation  
Mesh Quality  
Mesh Controls  
Meshing Stages  
Failure Diagnostics  
Tips for Using Shell Elements  
Hardware Considerations in Meshing  
Solvers in SolidWorks Simulation  
Choosing a Solver

## Appendix B: Customer Help and Assistance



### Training Registration

View our upcoming training schedule and training locations.

[Training Calendar](#)



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