

## SolidWorks Simulation Essentials

Prerequisites	Length	Description
Knowledge of SolidWorks and basic mechanical engineering concepts is required.	3 Days	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.

### Introduction to FEA

- What is SolidWorks Simulation, Finite Element Analysis?
- Build Mathematical, Finite Element Mode
- Solve Finite Element Mode
- Degrees of Freedom, Units of Measurement
- Calculations, Interpretation, Errors in FEA
- Limitations of SolidWorks Simulation

### The Analysis Process

- Stress in a Plate
- SolidWorks Simulation Options
- Preprocessing, Meshing, Post-processing
- Multiple Studies
- Reports

### Mesh Controls, Stress Concentrations & Boundary Conditions

- The L Bracket
- Analysis of Bracket with a Fillet
- Analysis of a Welded Bracket
- Understanding the Effect of Boundary Conditions

### Assembly Analysis with Contacts

- Contact Analysis
- Pliers with Local, Global Contact

### Symmetrical & Free Self-Equilibrating Assemblies

- Shrink Fit Parts
- Analysis with Soft Springs

### Assembly Analysis with Connectors

- Connecting Components
- Case Study: Vise Grip Pliers

### Compatible/Incompatible Meshes

- Compatible/Incompatible Meshing
- Case Study: Rotor

### Assembly Analysis Mesh Refinement

- Mesh Control in an Assembly
- Cardan Joint
- Draft Quality Coarse Mesh Analysis, High Quality Mesh Analysis

### Analysis of Thin Components

- Mesh with Solid Elements, Refined Solid Mesh
- Solid vs. Shell
- Creating Shell Elements
- Shell Elements – Mid-plane Surface
- Results Comparison
- Case Study: Joist Hanger, Pulley

### Mixed Meshing Shells & Solids

- Mixed Meshing Solids & Shells
- Case Study: Pressure Vessel

### Mixed Meshing Solids, Beams & Shells

- Mixed Meshing
- Case Study: Particle Separator

### Design Scenarios

- Suspension Design
- Multiple Load Cases
- Geometry Modification

### Thermal Stress Analysis

- Bimetallic Strip
- Examining Results in Local Coordinate Systems
- Saving Model in its Deformed Shape





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#### Adaptive Meshing

- Support Bracket
- h-Adaptivity, p-Adaptivity Study
- h vs. p Elements – Summary

#### Large Displacement Analysis

- Small vs. Large Displacement Analysis
- Small Displacement Linear Analysis
- Large Displacement Nonlinear Analysis
- Case Study: Clamp

#### Meshing, Solvers and Tips & Tricks

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

#### Did You Know?

- CAD MicroSolutions keeps class sizes small (8 or less) to ensure that each student receives personal attention.
- A professionally catered lunch is provided each day.
- Our instructors have the highest level of certifications attainable.
- Our professional training facility is outfitted with optimized Dell and Boxx Workstations with 3DConnexion 3D Controllers.
- All attendees that successfully complete the course receive an official course certificate from *Dassault Systemes SolidWorks Corporation* recognizing their achievement.

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