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Course Outline

SOLIDWORKS Simulation

Description	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.
Prerequisites	Equivalent or in addition to SOLIDWORKS Essentials
Duration	3 days
Delivery Mode	Face to Face **OR** Online

Introduction
What is SOLIDWORKS Simulation?
What Is Finite Element Analysis?
Build Mathematical Model
Build Finite Element Model
Solve Finite Element Model
Analyse 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
The Analysis Process
Case Study: Stress in a Plate
Project Description
SOLIDWORKS Simulation Options
Pre-processing
Meshing
Post processing
Multiple Studies
Reports

Lesson 2: Mesh Controls, Stress Concentrations and Boundary Conditions
Mesh Control
Case Study: The L Bracket
Project Description
Case Study: Analysis of Bracket with a Fillet

Lesson 4: Symmetrical and Free Self Equilibrated Assemblies
Shrink Fit Parts
Case Study: Shrink Fit
Project Description
Analysis with Soft Springs

Lesson 5: Assembly Analysis with Connectors
Connecting Components
Connectors
Case Study: Vice Grip Pliers

Lesson 6: Compatible/Incompatible Meshes
Compatible / Incompatible Meshing
Case Study: Rotor

Lesson 7: Assembly Analysis Mesh Refinement
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 8: Analysis of Thin Components Thin Components
Case Study: Pulley
Part 1: Mesh with Solid Elements

Lesson 10: Mixed Meshing Solids, Beams &Shells
Mixed Meshing
Case Study: Particle Separator

Lesson 11: Design Scenarios
Design Study
Case Study: Suspension Design
Part 1: Multiple Load Cases
Part 2: Geometry Modification

Lesson 12: Thermal Stress Analysis
Thermal Stress Analysis
Case Study: Bimetallic Strip
Examining Results in Local Coordinate
Systems
Saving Model in its Deformed Shape

Lesson 13: Adaptive Meshing
Adaptive Meshing
Case Study: Support Bracket
h-Adaptivity Study
p-Adaptivity Study
h vs. p Elements – Summary

Lesson 14: Large Displacement Analysis
Small vs. Large Displacement Analysis
Case Study: Clamp
Part 1: Small Displacement Linear Analysis

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Case Study: Analysis of a Welded
Bracket
Understanding the Effect of Boundary Conditions

Lesson 3: Assembly Analysis with Contacts
Contact Analysis
Case Study: Pliers with Global Contact
Pliers with Local Contact

Part 2: Refined Solid Mesh
Solid vs. Shell
Creating Shell Elements
Part 3: Shell Elements - Mid-plane Surface
Results Comparison
Case Study: Joist Hanger

Lesson 9: Mixed Meshing Shells & Solids
Mixed Meshing Solids and Shells
Case Study: Pressure Vessel

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