



### SOLIDWORKS SIMULATION PROFESSIONAL

PREREQUISITES	LENGTH	DESCRIPTION
<ul style="list-style-type: none"> <li>■ SolidWorks Simulation Essentials required. Knowledge of SOLIDWORKS and basic mechanical engineering concepts is recommended.</li> </ul>	2 Days	<ul style="list-style-type: none"> <li>■ This 1 day course will provide an in-depth coverage on the advanced topics in Finite Element Analysis (FEA) including heat transfer analysis, frequency analysis, fatigue, stability analysis based on the linear buckling concepts, 2D simulations and pressure vessel modulus.</li> </ul>
<p>▶ <b>FREQUENCY ANALYSIS OF PARTS</b></p>		
<ul style="list-style-type: none"> <li>■ Modal Analysis Basics</li> <li>■ Case Study: The Tuning Fork</li> <li>■ Project Description</li> <li>■ Frequency Analysis With Supports and Without Supports</li> <li>■ Frequency Analysis with Load</li> <li>■ Exercise 1: Frequency Analysis of a Car Suspension Bulkhead</li> <li>■ Exercise 2: Frequency Analysis of a Blower Fan</li> <li>■ Exercise 3: Frequency Analysis of an Impeller</li> </ul>		<p>▶ <b>SUBMODELING</b></p>
<p>▶ <b>FREQUENCY ANALYSIS OF ASSEMBLIES</b></p>		<ul style="list-style-type: none"> <li>■ Submodeling</li> <li>■ Case Study: Scaffolding</li> <li>■ Part 1: Parent Study</li> <li>■ Part 2: Child Study</li> </ul>
<ul style="list-style-type: none"> <li>■ Case Study: The Engine Mount</li> <li>■ Project Description</li> <li>■ All Bonded Contact Conditions</li> <li>■ Bonded and Allow Penetration Contacts</li> <li>■ Exercise 4: Frequency Analysis of a Particle Separator</li> </ul>		<p>▶ <b>TOPOLOGY ANALYSIS</b></p>
<p>▶ <b>BUCKLING ANALYSIS</b></p>		<ul style="list-style-type: none"> <li>■ Topology Analysis</li> <li>■ Case Study: Rear Bike Shock Link</li> <li>■ Goals and Constraints</li> <li>■ Manufacturing Controls</li> <li>■ Mesh Effects</li> <li>■ Load Cases in Topology Studies</li> <li>■ Export Smoothed Mesh</li> <li>■ Exercise 7: Topology Analysis of a Stool</li> </ul>
<ul style="list-style-type: none"> <li>■ Buckling Analysis</li> <li>■ Case Study: Particle Separator</li> <li>■ Exercise 5: Buckling Analysis of a Stool</li> <li>■ Exercise 6: Cabinet</li> </ul>		<p>▶ <b>THERMAL ANALYSIS</b></p>
<p>▶ <b>LOAD CASES</b></p>		<ul style="list-style-type: none"> <li>■ Thermal Analysis Basics</li> <li>■ Mechanisms of Heat Transfer</li> <li>■ Material Properties for Thermal Analysis</li> <li>■ Case Study: Microchip Assembly</li> <li>■ Project Description</li> <li>■ Steady-State Thermal Analysis</li> <li>■ Interfacial Conductance</li> <li>■ Transient Thermal Analysis</li> <li>■ Transient Analysis with Time Varying Load</li> <li>■ Transient Thermal Analysis using a Thermostat</li> <li>■ Exercise 8: Thermal Analysis of a Cup</li> </ul>
<ul style="list-style-type: none"> <li>■ Load Cases</li> <li>■ Case Study: Scaffolding</li> <li>■ Initial Load Case</li> </ul>		



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#### ► THERMAL ANALYSIS WITH RADIATION

- Case Study: Spot Light Assembly
- Steady State Analysis

#### ► ADVANCED THERMAL STRESS2D SIMPLIFICATION

- Thermal Stress Analysis
- Case Study: Metal Expansion Joint
- Thermal Analysis
- SOLIDWORKS Flow Simulation
- Exercise 9: Thermal Stress Analysis of a Microchip Testing Assembly
- Exercise 10: Thermal Stress Analysis of a Gas Tank
- Exercise 11: Thermal Stress Analysis of a Thermoelectric Cooler

#### ► FATIGUE ANALYSIS

- Fatigue
- Stress-life (S-N) Based Fatigue
- Case Study: Pressure Vessel
- Thermal Study
- Fatigue Terminology
- Fatigue Study
- Fatigue Study with Dead Load
- Exercise 12: Fatigue Analysis of a Basketball Rim
- Exercise 13: Fatigue of Trailer Hitch

#### ► VARIABLE AMPLITUDE FATIGUE

- Case Study: Suspension
- Fatigue Study
- Variable Amplitude Fatigue Event
- Rainflow Cycle Counting Method
- Noise in Random Loading History
- Rainflow Matrix Chart
- Results
- Fatigue Literature

#### ► DROP TEST ANALYSIS

- Drop Test Analysis
- Case Study: Camera
- Rigid Floor Drop Test
- Dynamic Analysis
- Linear vs. Nonlinear Solution
- Elastic Floor, Elasto-Plastic Material
- Elasto-Plastic Material Model
- Drop Test with Contact
- Exercise 14: Drop Test of a Clip

#### ► OPTIMIZATION ANALYSIS

- Optimization Analysis
- Case Study: Press Frame
- Static and Frequency Analysis
- Optimization Analysis
- Design Study
- Design Variable Summary
- Postprocessing Optimization Results
- Exercise 15: Optimization Analysis of a Cantilever Bracket
- Exercise 16: Optimization of Heat Sink

#### ► PRESSURE VESSEL ANALYSIS

- Case Study: Pressure Vessel
- Project Description
- Stress Intensity
- Membrane and Bending Stresses (stress linearization)
- Pressure Vessel Analysis
- General Primary Membrane Stress Intensity
- Manhole Nozzle Flange and Cover
- Stress Linearization