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Course: SOLIDWORKS Simulation

MFG

Description

Learn the basics of Finite Element Analysis (FEA). This course provides an indepth coverage on the basics of Finite Element Analysis (FEA) covering the entire analysis process from meshing to evaluation of results for parts and assemblies.

Traning objectives

On completion of this course you will have gained an understanding of using Analysis tools in SOLIDWORKS. Create better designs by performing analysis and evaluating the behaviour of your parts and assemblies under actual service conditions.

Prerequisites

Mechanical design experience.

Experience with Windows Operating System.Completed the SOLIDWORKS Essentials training course, or equivalent.

Knowledge and understanding of the fundamentals of Finite Element Analysis (FEA). At least one month using SOLIDWORKS software.

Skills you will acquire

Able to analyse parts and assemblies. Able to interpret analysis results. Able to conduct different types of analysis.

Who should attend

All SOLIDWORKS Simulation users wishing to create better designs in SOLIDWORKS by performing analysis and evaluating the behaviour of their parts and assemblies under actual service conditions.

Delivery mode

Face-to-face or Online

Virtual Classroom

Duration

3 days or 10 hours

ELITE 190 CLUB Subscription Service 2018 SOLIDWORKS

Course Outline

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
- 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

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
- 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

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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
- 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