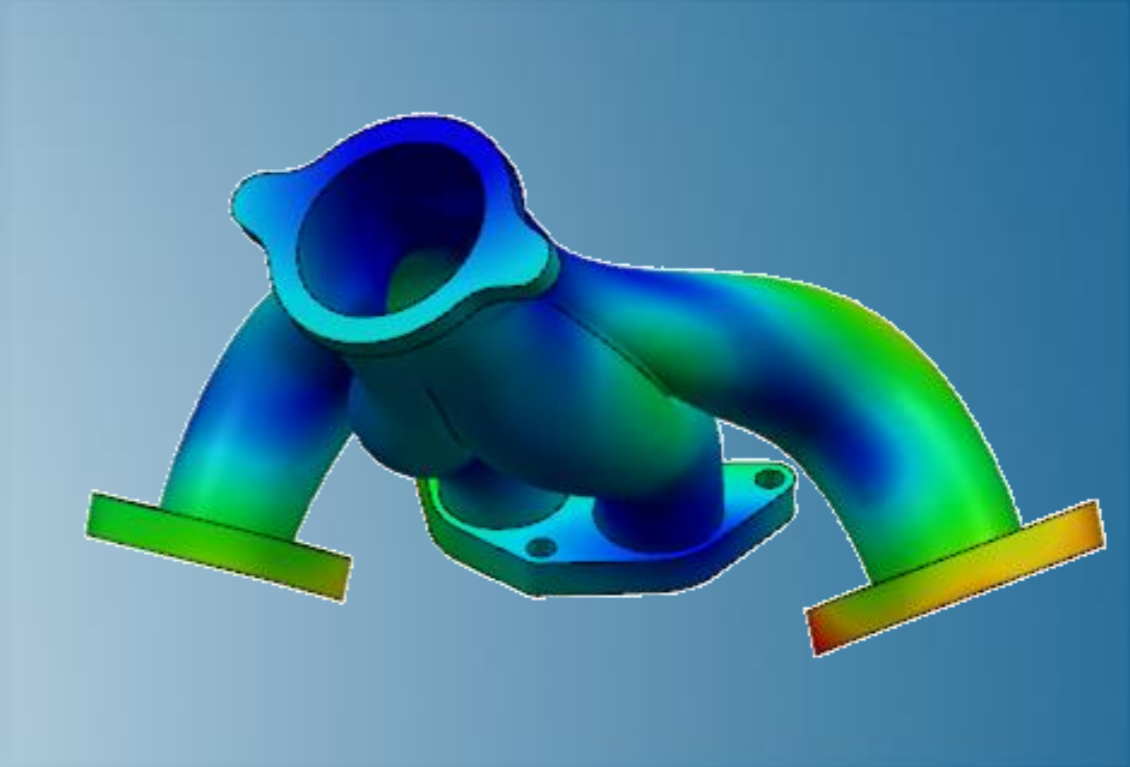


Mechanical Scenario Creation Essentials

R2017x



3DEXPERIENCE[®]



About this Course

Course objectives

Upon completion of this course you will be able to:

- ▶ Perform structural simulations (linear and nonlinear; statics and dynamics)
- ▶ Perform thermal simulations
- ▶ View and evaluate simulation results

Targeted audience

This course is intended for the following roles:

- ▶ Mechanical Analyst
- ▶ Multiphysics Simulation Researcher

Prerequisites

The following course is required prior to taking this one:

- ▶ Structural Model Creation Essentials



2 days

Day 1

- ▶ Lesson 1 Getting Started with Simulation
- ▶ Workshop 1 Linear Static Analysis of a Cantilever Beam

- ▶ Lesson 2 Steps and Static Simulations
- ▶ Workshop 2 Creep of a Pipe Intersection

- ▶ Lesson 3 Loads, Restraints and Initial Conditions
- ▶ Workshop 3a Analysis of a Reinforced Panel
- ▶ Workshop 3b Cantilever Beam with Multiple Load Cases

- ▶ Lesson 4 Contact
- ▶ Workshop 4 Pump Model – Steps, Loads, and Contact

- ▶ Lesson 5 Running Simulations and Postprocessing
- ▶ Workshop 5 Nonlinear Static Analysis of a Pump Assembly

Day 2

- ▶ Lesson 6 Dynamic Simulations
- ▶ Workshop 6 Vibrating Cantilevered Plate

- ▶ Lesson 7 Linear Dynamics
- ▶ Workshop 7a Frequency Analysis of an Exhaust Manifold
- ▶ Workshop 7b Harmonic Response Analysis of a Control Arm
- ▶ Workshop 7c Cargo Crane under Dynamic Loading

- ▶ Lesson 8 Nonlinear Dynamics
- ▶ Workshop 8 Pipe Whip Simulation

- ▶ Lesson 9 Quasi-static Simulations
- ▶ Workshop 9a Channel Forming
- ▶ Workshop 9b Bending of a Thin Tube

- ▶ Lesson 10 Heat Transfer Simulation (optional)
- ▶ Workshop 10 Thermal Simulation of a Pump Housing (optional)

Additional Material

- ▶ Appendix 1 Element Selection Criteria
- ▶ Appendix 2 Complex Eigenvalue Analysis
- ▶ Workshop 11 Brake Squeal Analysis

- ▶ Appendix 3 Smoothed Particle Hydrodynamics
- ▶ Workshop 12 Bird Strike on an Airplane Engine Blade

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Revision Status

Lesson 1	1/17	Updated for R2017x
Lesson 2	1/17	Updated for R2017x
Lesson 3	1/17	Updated for R2017x
Lesson 4	1/17	Updated for R2017x
Lesson 5	1/17	Updated for R2017x
Lesson 6	1/17	Updated for R2017x
Lesson 7	1/17	Updated for R2017x
Lesson 8	1/17	Updated for R2017x
Lesson 9	1/17	Updated for R2017x
Lesson 10	1/17	Updated for R2017x
Appendix 1	1/17	Updated for R2017x
Appendix 2	1/17	Updated for R2017x
Appendix 3	1/17	Updated for R2017x

Workshop 1	1/17	Updated for R2017x
Workshop 2	1/17	Updated for R2017x
Workshop 3a	1/17	Updated for R2017x
Workshop 3b	1/17	Updated for R2017x
Workshop 4	1/17	Updated for R2017x
Workshop 5	1/17	Updated for R2017x
Workshop 6	1/17	Updated for R2017x
Workshop 7a	1/17	Updated for R2017x
Workshop 7b	1/17	Updated for R2017x
Workshop 7c	1/17	Updated for R2017x
Workshop 8	1/17	Updated for R2017x
Workshop 9a	1/17	Updated for R2017x
Workshop 9b	1/17	Updated for R2017x
Workshop 10	1/17	Updated for R2017x
Workshop 11	1/17	Updated for R2017x
Workshop 12	1/17	Updated for R2017x

Lesson 1: Getting Started with Simulation Scenarios

Lesson content:

- ▶ Simulation Apps in the **3DEXPERIENCE** Platform
- ▶ Physics Modeling Apps
- ▶ Finite Element Model Representation
- ▶ Workflow to create, execute and review a simulation
- ▶ Scenario
- ▶ The Scenario Interface
- ▶ Results
- ▶ Simulation Conventions in the **3DEXPERIENCE** Platform
- ▶ Workshop Preliminaries



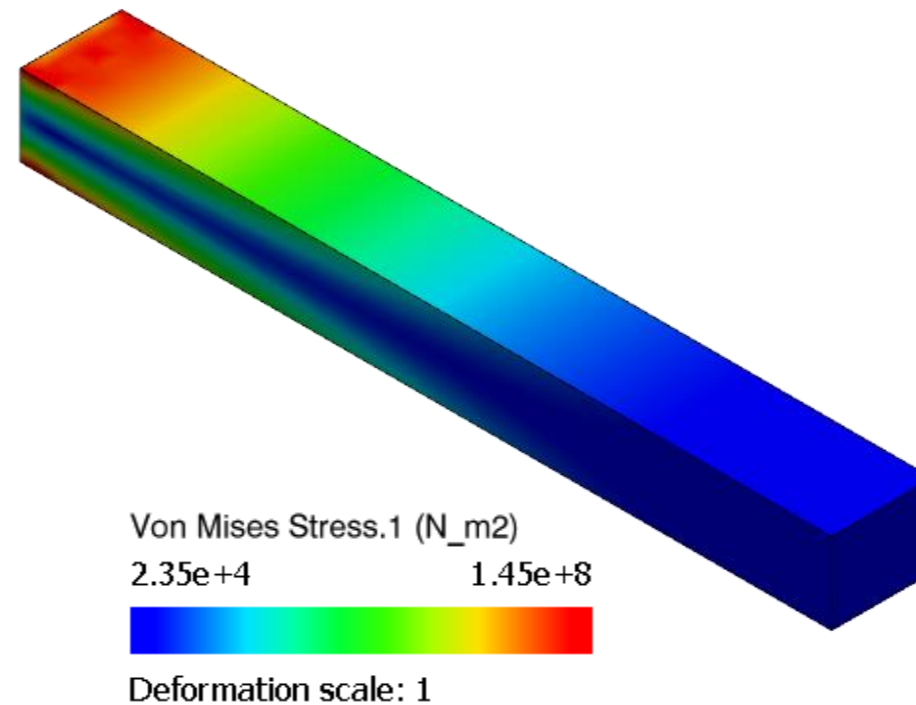
30 minutes

Workshop: Linear Static Analysis of a Cantilever Beam

In this workshop you will become familiar with the different apps that are used to set up and execute a simulation. The geometry of the cantilever beam shown below is provided. You will create a tetrahedral mesh, assign a material, create a section property, create a simulation and execute it. Afterwards, as an optional exercise, you will create and use a FEM rep with a hexahedral mesh.

After completion of this exercise, you will be:

- Familiar with the layout and structure of the **3DEXPERIENCE** Platform.
- Able to set up a simple simulation.
- Familiar with navigating between different apps.



45 minutes

Lesson 2: Steps and Static Simulations

Lesson content:

- ▶ Simulation Steps and Procedures
- ▶ Overview of Nonlinear Problems
- ▶ Overview of Static Simulation
- ▶ Understanding Nonlinear Static Simulation
- ▶ Understanding Implicit Methods
- ▶ Creating Static Steps
- ▶ Options for Static Steps
- ▶ Understanding Perturbation Procedures
- ▶ Creating Static Perturbation Steps
- ▶ Understanding Multistep Simulations
- ▶ Analysis Cases



45 minutes

