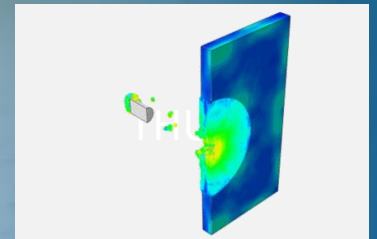


MODELING EXTREME DEFORMATION AND FLUID FLOW WITH ABAQUS

SIMULIA COURSE DESCRIPTION



Level: Advanced
Products: Abaqus
Disciplines: Structures

Audience
 This course is recommended for simulation analysts whose work involves modeling extreme deformation and fluid flow.

Why take this course?

Abaqus includes several advanced techniques for modeling extreme deformation and fluid flow. The pure Eulerian analysis capability in Abaqus/Explicit allows for effective modeling of fluid flows and extremely large deformations in solids. Coupling the power of this capability with the traditional Lagrangian approach makes it possible to simulate complicated multiphysics phenomena such as fluid-structure interactions where highly deformable materials interact with relatively stiff bodies. The need for modeling high-velocity impacts, extremely violent fluid flows, and material phase changes requires the use of Smoothed Particle Hydrodynamics, a meshless Lagrangian method capable of solving these challenging problems efficiently. This course aims at providing users with a solid understanding of the Coupled Eulerian-Lagrangian (CEL) and Smoothed Particle Hydrodynamic (SPH) methods and illustrating approaches to setting-up and analyzing real world problems using these advanced analysis methods.

What will you learn?

Upon completion of this course you will be able to:

- Coupled Eulerian-Lagrangian (CEL) method
- Create Eulerian meshes and define the initial material location within an Eulerian mesh
- Apply initial conditions, boundary conditions and loads to materials in the Eulerian domain
- Use general contact to model Eulerian-Lagrangian interactions
- Model fluids using the Equation-of-State material

domain

Smoothed Particle Hydrodynamic (SPH) method

- Create SPH meshes
- Automatically convert conventional continuum elements to SPH particles
- Define initial conditions, boundary conditions, and loads on SPH particles
- Define contact interactions between SPH particles and element-based or analytical surfaces
- Understand the differences between the CEL and SPH approaches

Explore Your Learning Options

Live Sessions · Visualize material boundaries within the Eulerian domain Engage in Real-Time, interactive group Workshops guided by experts. Learn and collaborate live in your preferred language and time zone.	Join a live session
On-Demand Learning Access expert-designed courses anytime, anywhere. Perfect for independent learners looking to build skills on their schedule.	Start Learning Now
Private Training Exclusive, tailor-made sessions designed to meet your team's unique goals with expert guidance.	Contact Us for Custom Training



Gain hands-on experience and master real-world workflows through guided, practical training sessions.

Apply nonlinear analysis techniques to simulate complex structural and multiphysics problems accurately.

– SIMULIA Training Expert Team

What You Need to Know Before Starting

Introduction to Abaqus or equivalent and experience using Abaqus.

Agenda for Virtual Live Sessions

Participate in hands-on, real-time workshops where you'll gain practical expertise. Here's what you'll cover:

[Join an Instructor Led Session](#)

Day 1

Lesson 1: Introduction
Lesson 2: Overview of CEL (Coupled Eulerian-Lagrangian) Analysis
Lesson 3: Creating a CEL Model
Workshop 1: Deformation of an Elastic Dam under Time-dependent Water Pressure
Lesson 4: Abaqus/CAE Volume Fraction Tool
Lesson 5: CEL Modeling Techniques
Workshop 2: Bird Strike Impact on Double-walled Aircraft Fuselage

Day 2

Lesson 6: CEL for Fluid Applications
Lesson 7: Overview of SPH (Smoothed Particle Hydrodynamics)
Lesson 8: SPH Modeling Techniques
Workshop 3: Bird Strike on an Airplane Engine Blade
Lesson 9: Comparison of CEL and SPH

Additional Material

Appendix 1: SPH Theory

Want to Learn More?

Expand your knowledge by exploring our [course Catalog](#) and browsing learning paths on [Eduspace](#), our dedicated e-learning platform.

Join the Community!

[Join the SIMULIA community](#) to connect, learn, and stay updated.



3DEXPERIENCE®

Dassault Systèmes is a catalyst for human progress. Since 1981, the company has pioneered virtual worlds to improve real life for consumers, patients and citizens.

With Dassault Systèmes' 3DEXPERIENCE platform, 370,000 customers of all sizes, in all industries, can collaborate, imagine and create sustainable innovations that drive meaningful impact.

For more information, visit: www.3ds.com

Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Asia-Pacific
Dassault Systèmes
17F, Foxconn Building,
No. 1366, Lujiazui Ring Road
Pilot Free Trade Zone, Shanghai 200120
China

Americas
Dassault Systèmes
175 Wyman Street
Waltham, Massachusetts
02451-1223
USA

**Virtual Worlds
for Real Life**

