Composites Simulation Engineer Essentials
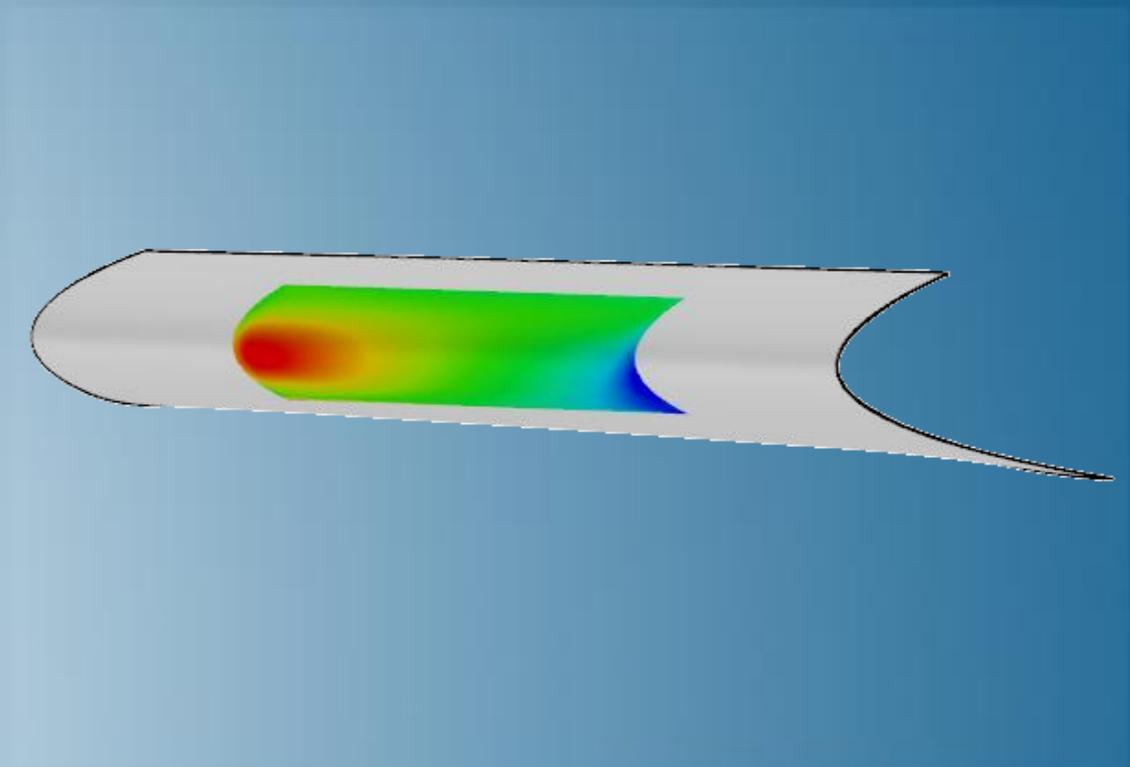
R2017x

About this Course

Course objectives
Upon completion of this course you will be able to:

▷ Perform simulations of composite materials

Targeted audience
This course is intended for the following role:

▷ Composites Simulation Engineer

Prerequisites
Any *one* of the following courses is required prior to taking this one:

▷ Mechanical Scenario Creation Essentials
▷ Structural Scenario Creation Essentials
▷ Linear Dynamics Scenario Creation Essentials

1 day

Day 1

▷ Lesson 1   Composites Design and Analysis

▷ Lesson 2   Modeling of Composites

▷ Workshop 1   Material properties for a 3-ply plate

▷ Lesson 3   Overview of Composites Part Design

▷ Workshop 2   Layup of a 3-ply plate

▷ Lesson 4   Simulation of Composites

▷ Workshop 3a   Simulation of a 3-ply plate

▷ Workshop 3b   Laminated Composite Panel

▷ Workshop 3c   Composite Leading Edge Wing Slat

▷ Lesson 5   Damage and Failure in Composites (*optional*)

▷ Workshop 4   Simulation of a 3-ply plate with damage (*optional*)

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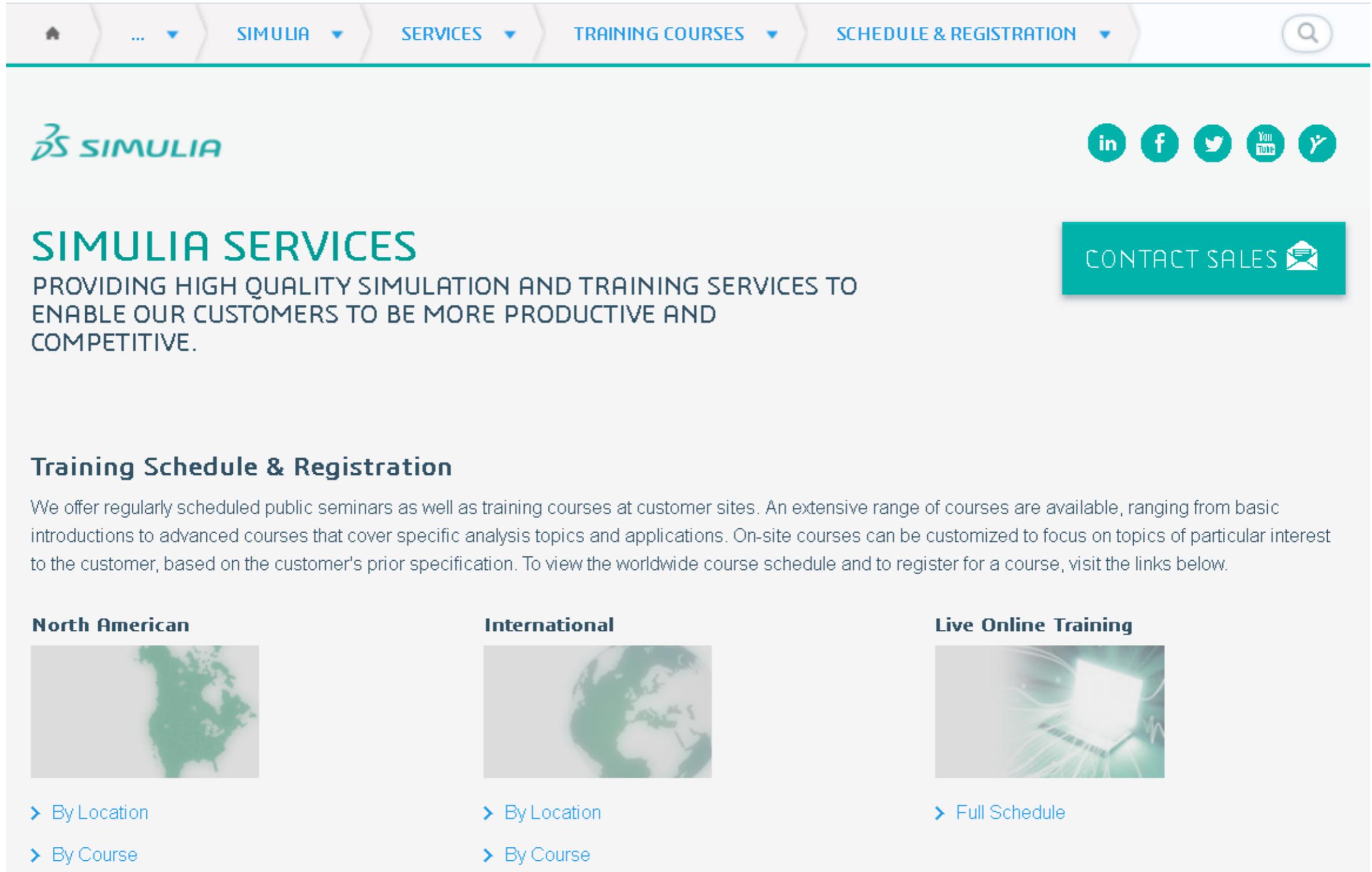Let the **SIMULIA Learning Community** be *Your* Portal to 21st Century Innovation

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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**
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 3c	**1/17**	**Updated for R2017x**
Workshop 4	**1/17**	**Updated for R2017x**

Lesson 1: Composites Design and Analysis

Lesson content:

▷ Introduction

▷ Composites in the **3D**EXPERIENCE Platform

▷ Terminology and Tree Structure

▷ Composites Parameters

▷ Stacking Engineering

30 minutes

Lesson 2: Modeling of Composites
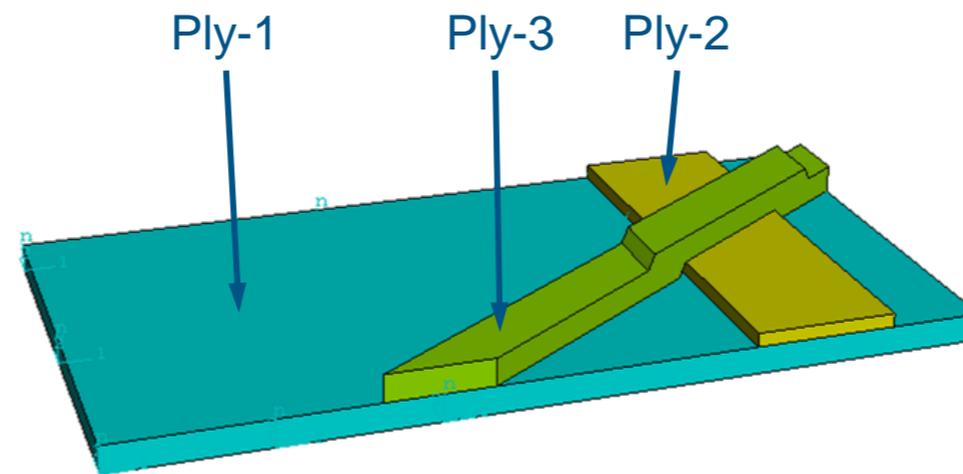
Lesson content:

▷ Overview

▷ Material Parameters

▷ Anisotropic Elasticity

▷ Laminate Failure

▷ Failure Measures

▷ Failure Criteria

▷ Workshop Preliminaries

45 minutes

In this exercise we will define the material and composites properties of the plate shown below. The plate consists of three plies of different thicknesses.

Ply-1   Ply-3   Ply-2

After completion of this exercise, you will be able to:

a. Understand the significance of Composites Domain properties in a simulation
b. Define lamina elastic material properties
c. Define failure properties

15 minutes

Lesson 3: Overview of Composites Part Design

Lesson content:

▷ Manual Ply Creation

▷ Analysis of the CPD stack

▷ Zone Based Design

▷ Grid Based Design

▷ Comparing Design Approaches

▷ Producibility

▷ Managing the Plies Interactively

▷ Managing the Plies Stacking

▷ Best Practices in CPD

This lesson is intended as a high-level overview of the various composites part design approaches and tools available in the **3D**EXPERIENCE Platform via the Composites Design app.
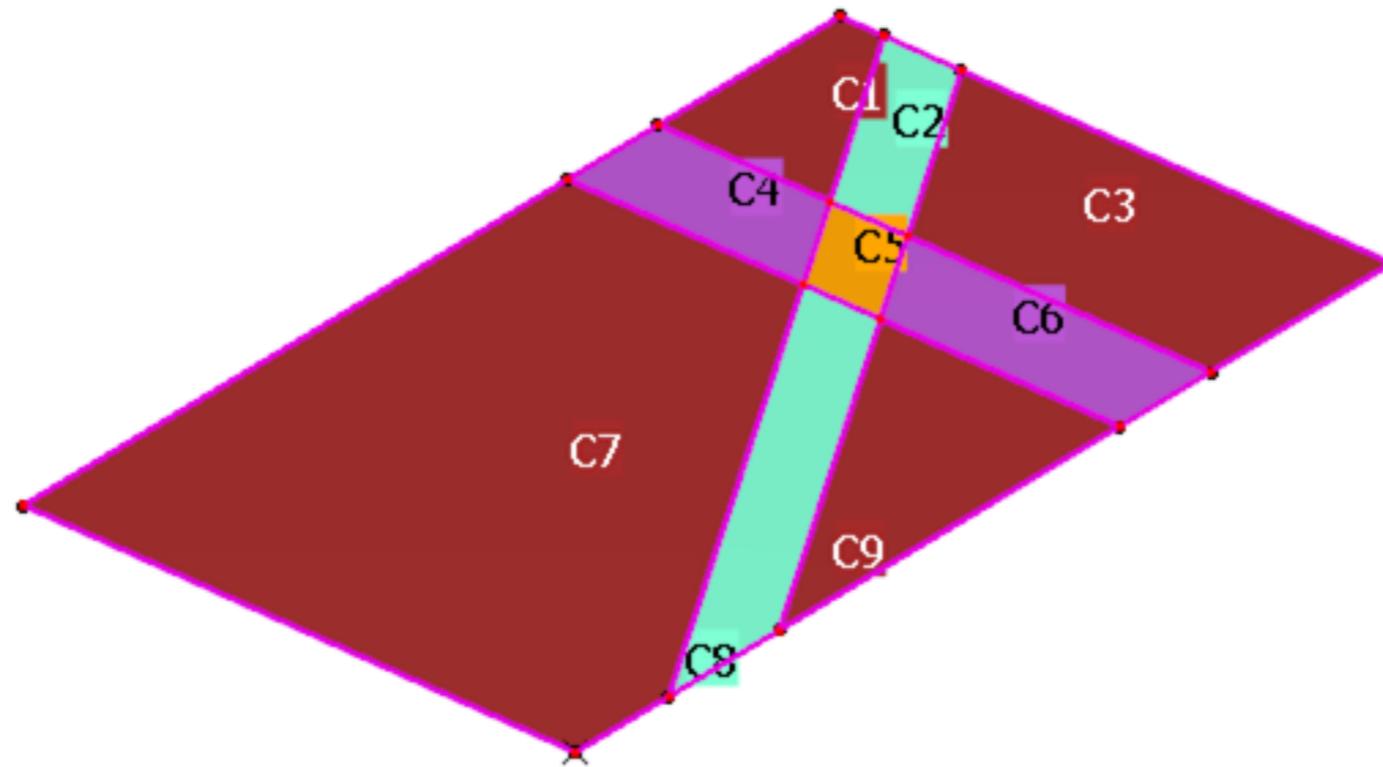
The workshop exercise associated with this lesson is *optional* and requires access to the Composites Design app.

1 hour

Workshop 2: Layup of a 3-ply plate

In this exercise we will consider the layup of a 3-ply plate. Different composite layup techniques are illustrated.

When you complete this exercise you will be able to:

    a. Define plies manually.

    b. Define plies using a zone approach.

    c. Define plies using a grid approach.

This workshop *optional* and requires access to the Composites Design app.

1 hour