TRAINING PROGRAMME · INTER-COMPANY COURSE

# code_aster and HPC computing

CODE_aster

| DATES | DURATION | FORMAT | LEVEL | PRICE |
|---|---|---|---|---|
| **May 4, 2027** | **1 day · 7 h** | **Remote · English** | **Advanced** | **€900 excl. VAT**<br>Academic €400 excl. VAT |

## Audience

- **Industry:** simulation engineers working on large models who want to cut turnaround times.
- **Academia:** researchers and PhD students running intensive computations.

## Prerequisites

Basic command of code_aster. General notions of parallel computing welcome; no prior HPC experience needed.

## Practical arrangements

**Maximum group size:** 6 participants per trainer during practical work. Inter-company course.

## Registration and access time

Registration through the online form on the session page, at least 30 days before the start of the session: https://simvia.tech/services/training/code-aster-hpc-online-training-202704

## Overview
(context, benefits)

Master parallel computing with code_aster: from HPC fundamentals to diagnosing and optimizing the performance of your industrial computations on a cluster.

**A resolutely hands-on course:** practical work built on a review of the theoretical fundamentals, with exercises of increasing difficulty, from discovery to an industrial case.

**The complete workflow:** the tools of the simulation chain (Salomé, code_aster, ParaView) are used together, as in a real study.

**Practising trainers:** our engineers and PhDs use these codes every day on industrial projects.

**Close supervision:** 1 trainer for a maximum of 6 trainees during practical work.

**An inter-company format** that encourages participants to share their experience with peers.

## Objectives and targeted skills

**Learning objectives, assessed during and at the end of the course. By the end of the course, participants will be able to:**

- Identify the parallel models (MPI, OpenMP, domain decomposition) used by code_aster.
- Parallelise a code_aster analysis and measure its speed-up and efficiency.
- Choose suitable computing resources for a study on a cluster.
- Diagnose and optimise an industrial analysis that scales poorly.

## Course content

**MORNING** **Parallel computing fundamentals and code_aster HPC architecture**

- Why parallelise a finite element analysis, and where the cost lies
- Shared memory, distributed memory, hybrid MPI/OpenMP
- Domain decomposition and parallel solution strategies
- code_aster architecture and parallelisation options

**AFTERNOON** **Implementation, practicals and performance diagnosis**

- Keywords and structuring the input for a parallel run
- Practical: parallelise a run, measure speed-up and parallel efficiency
- Scaling, choice of resources, indicators to monitor
- Practical: diagnose and optimise an industrial case that scales poorly

## Teaching methods

Remote course in a virtual classroom, in English.

Active teaching alternating theory and hands-on practical work on the participant's own computer, with exercises of increasing difficulty.

**Resources:** virtual classroom with screen sharing, course materials given to each participant, remote assistance from the trainer during practical work.

Pre-course call to understand participants' needs; end-of-day review (feedback and adjustments); immediate satisfaction survey at the end of the course.

## Supervision

Simvia adapts each course to the actual needs of the trainees. Sessions rely on active teaching, with practical and personalised exercises that anchor learning in real time.

Theory sessions alternate with supervised practical work.

## Equipment

Computer with an internet connection, microphone and speakers or headset; software installed before the session (installation help is provided).

## Duration

**Total duration:** 1 day, i.e. 7 hours.
**Schedule:** 9:00 am – 12:30 pm and 1:30 pm – 5:00 pm.

## Dates

**May 4, 2027**

## Location

Remote course in a virtual classroom, inter-company format. The connection link is sent with the joining instructions.

## Price per participant

**Company:** €900 excl. VAT per participant.
**Academic:** €400 excl. VAT per participant.
**Included:** help with installing the latest version of the software, training completion certificate.

French companies may have the course covered by their OPCO (French skills operator) under the skills development plan. Not eligible for CPF (French personal training account).

## Accessibility

Simvia is committed to making its courses accessible to people with disabilities; our premises are accessible to people with reduced mobility. Our trainers adapt their teaching methods to each situation. For any specific need, please contact our disability officer: oumaima.nassif@simvia.tech.

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| **Course manager, contact** | **Teaching manager:** Florian Hermet, florian.hermet@simvia.tech<br>**Administrative and disability officer:** Oumaima Nassif, oumaima.nassif@simvia.tech<br>**General contact:** training@simvia.tech |
| **Trainers** | **Basile Marchand**<br>PhD in computational mechanics, computational mechanics tech lead<br>Practising code_aster trainer at Simvia, working daily on industrial projects. If unavailable, a trainer with equivalent expertise is appointed and confirmed in the joining instructions. |
| **Attendance and certificate** | Attendance sheet signed by trainees and trainer for each half-day.<br>Training completion certificate issued upon passing the final assessment. |
| **Assessment** | Formative assessment during the practical work.<br>Summative assessment at the end of the day (validating learning across the course).<br>Immediate satisfaction survey at the end of the course.<br>Delayed assessment 2 months after the course, for the trainee and the company. |
| **Going further** | Simvia offers specialisation modules and a technical support service to deepen and extend skills development. Full catalogue: https://simvia.tech/services/training/catalog |