

# Modeling & Finite Elements



ECTS  
3 crédits



Hourly volume  
68h

## Introducing

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### Objectives

At the end of this module, the student will have understood and be able to explain (main concepts):

-How to model and to compute with the Finite Element Method (FEM) classical systems of PDEs.

At the end of this module, the student should be able to:

- ↳ write the weak (variational) form of the classical PDE models (with the corresponding energy minimization, symmetric case).
- ↳ Understand the mathematical analysis of classical PDE models.
- ↳ Model and compute with the FEM various classical phenomena (diffusive, convective, elasticity, etc.) which are ubiquitous in physics, process.
- ↳ Employ Finite Element libraries, e.g. Fenics (in Python)
- ↳ Implement advanced computational techniques in case of large-scale modeling (model reduction, coupling of numerical models and codes).

## Practical info

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### Location(s)

 Toulouse

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## Necessary prerequisites

Fundamentals of PDE models, math. analysis,

Basic numerical methods-analysis.