Modeling and scientific computing in fluid and structural mechanics

ECTS
4 crédits

Hourly volume
55h

Introducing

Objectives

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

The fundamentals of Mechanics for fluid and deformable solids, from a physical, mathematical and numerical point of view.

The student will be able to:
- Understand the physical meaning of the various terms used in fluid mechanics and elasticity models.
- Calculate exact solutions of simple problems and interpret them physically
- Evaluate orders of magnitude and know the physical meaning of the main dimensionless numbers
- Formulate and apply a finite volume method for numerically solving simple problems of fluid mechanics
- Formulate and solve the problem of elasticity by means of the finite element method.
- Use an industrial software to model and compute the elasticity problem in static as well as in dynamic.
- Write and implement a mixed formulation to couple different elastic domains and different numerical codes used as black-boxes.

Necessary prerequisites

Fundamentals in:
Continuum mechanics
Numerical analysis
Partial derivative equations

Practical info

Location(s)

Toulouse