



MASTER'S DEGREE
PROGRAMME // M2



CENTRALE LYON
ENISE



MECHANICAL ENGINEERING

*Computational Solid
Mechanics*



enise.fr/en



How to apply?
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MASTER IN MECHANICAL ENGINEERING

Computational Solid Mechanics

2 semesters taught in French, including 4 months of internship in co-accreditation with École Centrale de Lyon and Université de Lyon 1

Description

The Computational Solid Mechanics track in the Mechanics master's program (M2) focuses on the mastery and development of innovative numerical methods (Big Data, X-FEM, Proper Generalized Decomposition, stabilized finite elements, etc.) in fluid, solid and structural mechanics, integrating the associated multi-scale or multi-physics couplings. The teaching is positioned at the interface between complex modeling, digitization and resolution, ranging from elasto-static or Newtonian fluids to the treatment of temporal non-linear problems (cyclic plasticity, contact, rupture, capillarity, etc.). The topics covered are directly linked to current industrial issues, with a focus on the trade-off between fidelity and robustness for optimum algorithmic and energy efficiency.

Objectives

Train experts in the development of innovative simulations in the context of virtual engineering, which is increasingly present in industry. With a strong background in the mechanics of materials and structures, coupled with a mastery of cutting-edge numerical tools, the proposed course aims to train executives with the ability to manage R&D projects directly related to current societal concerns: structural lightening, durability control, dynamic sensing, etc.



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COMMON COURSES*

12 ECTS



Finite element method in mechanics



Modeling in mechanics of materials

SPECIALIZATION COURSES*

12 ECTS



Big data, model reduction and digital twins



Multi-physics couplings for processes



Advanced numerical methods

OPENING COURSES*

6 ECTS



Intensive calculations



Numerical methods for simulating dynamic mechanical models

COMPLEMENTARY COURSES*

9 ECTS



English for business communication level 2



Socio-economics of business



Internship preparation. Bibliography

INTERNSHIP*

21 ECTS



Minimum 16 weeks



Written report



Oral presentation

* All the courses are taught **exclusively in French** ■ ■