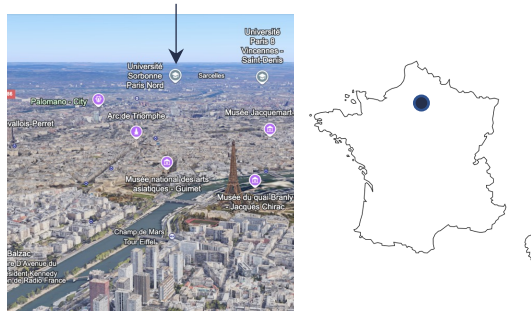


You have

A background
in material science, civil or
mechanical engineering?

You want

To have a specialisation
in theoretical and
computational mechanics?



Contact us for more
information!



fabien.cazes@univ-paris13.fr



WELCOME!

*Request support for international grant
application*

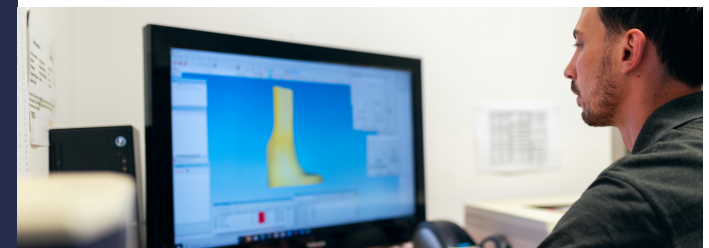
UNIVERSITÉ
SORBONNE
PARIS NORD



UNIVERSITÉ SORBONNE PARIS NORD MEMBRE :



***An international
Master degree
In
computational
and
theoretical mechanics***



Scope

The 1 year (M2) International Master in **Modelling & Simulation in Mechanics** is proposed by the [Institut Galilée](#), at [Sorbonne Paris North University](#) (USPN, North Paris, France).

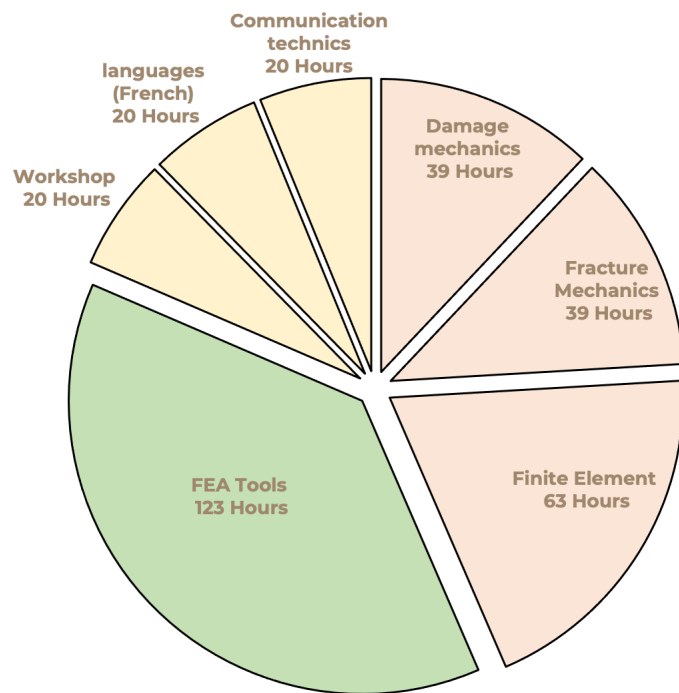
All courses will be held in **English** by French researcher internationally recognized in the field of **theoretical** and **numerical modelling** in mechanics, from the [LSPM-CNRS](#) research lab at Institut Galilée | USPN.

This program is open to students

- which **already hold a master degree** in mechanical engineering, civil engineering or material science,
- or
- which hold an **equivalent of a M1** in the same topics.

Course Scheme

1st semester



Finite Element Method

- Concept of Finite Elements (degree of freedom, interpolation, ...).
- Numerical solution of a FE problem (assembly, ...) and implementation.
- Design an explicit or implicit algorithm to solve an EF problem in linear & nonlinear elasticity.
- Recognize some common problems (locking,).

Damage Mechanics

- Classical damage models.. Gradient damage approaches.

Fracture Mechanics

- Linear Elastic Fracture Mechanics, J-integral.
- Cohesive Zone Modeling.
- Experimental characterization.

FEA Tools

- Explicit or implicit algorithm to solve an EF problem in plasticity.
- Using Abaqus CAE. (beams, plates, plasticity, dynamics, failure).
- Python scripting.
- Recognize and solve convergence problems.
- Alternative softwares: Castem
- Usage in Abaqus of User Subroutine in Abaqus or CAD software.
- Explicit or implicit algorithm to solve a FE problem in plasticity. Code implementation.

Foreign Language

- French

Communication Technics

2nd semester: **internship**



Numerical courses

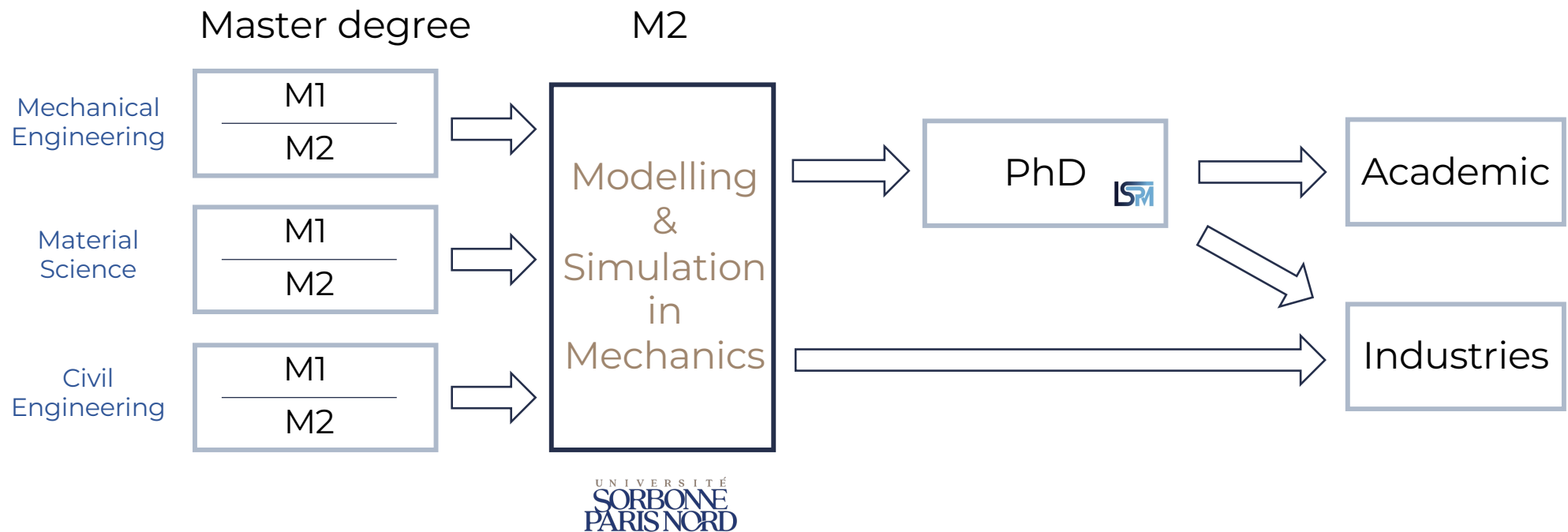


Theoretical courses



Soft skills

Possible career pathways





FAQ

Q1. What are the tuition fees for the program ?

618 €/year for French and non French students as defined by the French Law.

Q2. I am currently in Bachelor 3rd year, can I apply ?

No, you need at least to have completed the Bachelor.

Q3. I am currently in first year of Master degree (M1), can I apply ?

Yes, as the proposed programs correspond to the 2nd year of a master degree

Q4. I am currently in second year of Master degree (M2), can I apply ?

Yes, especially if you need to get a specialisation in computational mechanics

Q5. I finished my Master degree (M2) few years back, can I apply ?

Yes, especially if you need to get a specialisation in computational mechanics



FAQ

Q6. How can I apply?

Through the website “etudes en France”. USPN or Campus France will provide assistance for the application process.

Q7. I have applied. How can I find accommodation in France?

If you have a grant from the French embassy, an accommodation will be found for you in a CROUS network (Student Accommodation)

Q8. Will I get some financial support for this program?

USPN is ready to provide support for application to Grant from French embassy (“**France Excellence**”), which corresponds to 860€/month for one year. In India, this grant is called Charpak fellowship (application from open 18th November – 20th February). French government support accommodation fee (‘APL’ support) as well as (1€ for a meal at lunch time for all students since January, 2025).

Q9. What is the needed budget to spend 1 year in France?

For accommodation (1 room or apartment) in Paris’ suburb cost 700€/month. For living expenses, 400€/month is needed (transportation, food, insurances...)



FAQ

Q10. How long is the curriculum ?

The program starts at the beginning of September and ends at the end of July/August.

Q11. What language are the courses taught in?

All courses are 100% in English.

Q12. What kind of internship can I get ?

The internship can be done in a company or in an academic institute (in France or abroad). In France, the internship is paid at least €650/month (in addition to any scholarships).

Q13. Which degree will I get ?

You will get a Masters degree in “Science & Engineering of Materials” from university of Sorbonne Paris Nord.

Q14. What is the needed budget to spend 1 year in France?

For accommodation (1 room or apartment) in Paris' suburb cost 700€/month. For living expenses, 400€/month is needed (transportation, food, insurances...)

Teaching Staff

- [Fabien CAZES](#) (head of the speciality): specialist in plasticity, fracture mechanics and their implementation in FE software (Cast3M).
- [Ioan IONESCU](#): specialist in high deformations elasticity, vibration and high deformation plasticity (FreeFEM).
- [Radhi ABDELMOULA](#): Specialist in 2nd gradient Fracture and damage Mechanics, and their implementation in FE software (Comsol, FeniCs).
- [Joseph PAUX](#): Specialist in homogenisations approaches, crystal plasticity, ductile damage mechanics, and their implementation in FE software (Abaqus).
- [Yann CHARLES](#): Specialist in Abaqus FE software, python scripting & User Subroutine. Research activities on hydrogen-material interactions.