Université Paris-Saclay
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M1 Advanced Materials, Structure and Energy for sustainable construction

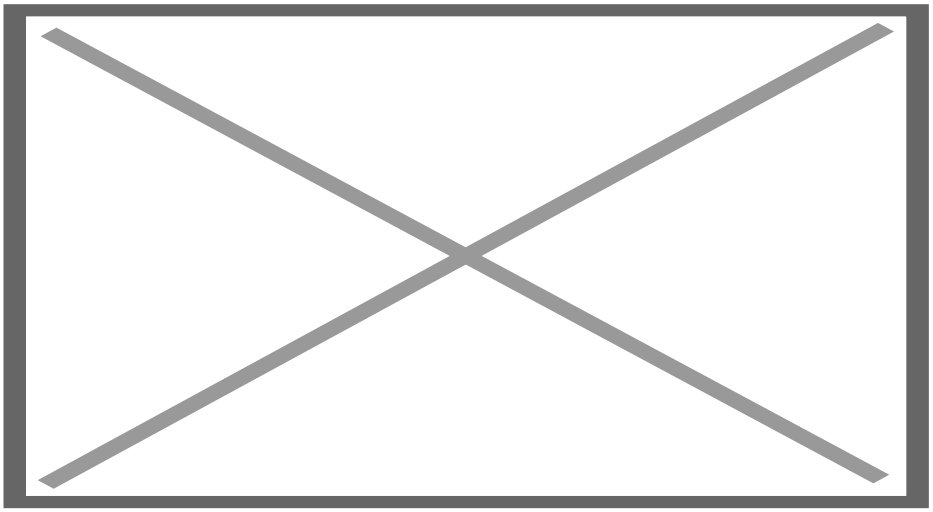
Master's degree
Specialisation Civil Engineering
Enrolment type
Formation initiale
Language(s) of instruction
French

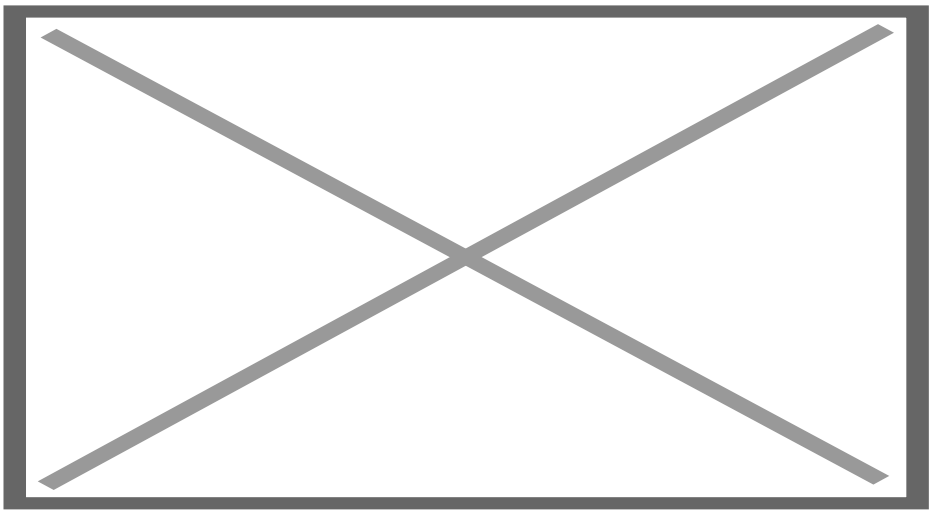
The Master's 1 programme in ‘Materials, Structures and Energy for Sustainable Construction’ is the first year of a Master's degree course geared towards careers in research and higher education. This programme aims to provide students with in-depth scientific and technical knowledge, enabling them to tackle the complex issues specific to the construction industry, while taking into account current industrial, environmental and societal challenges.

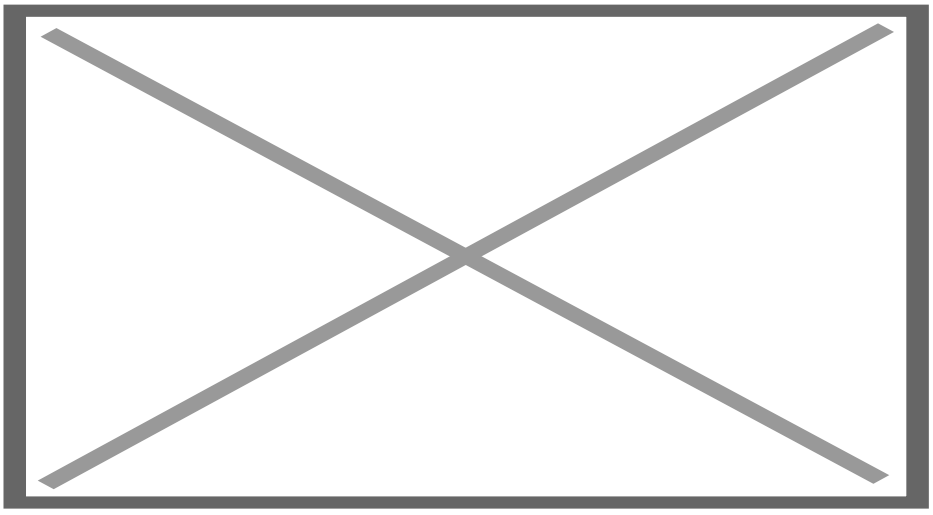
The Master's 1 programme is organised into teaching units that enable students to acquire in-depth skills in designing, organising and managing work resulting from high-level scientific and technical activities. The two semesters combine a core curriculum, focused on theoretical disciplines and essential fundamental knowledge, with optional modules that allow each student to tailor their training to their particular interests. The programme concludes with a three-month research internship, providing an opportunity to put the knowledge and skills acquired during the year into practice.

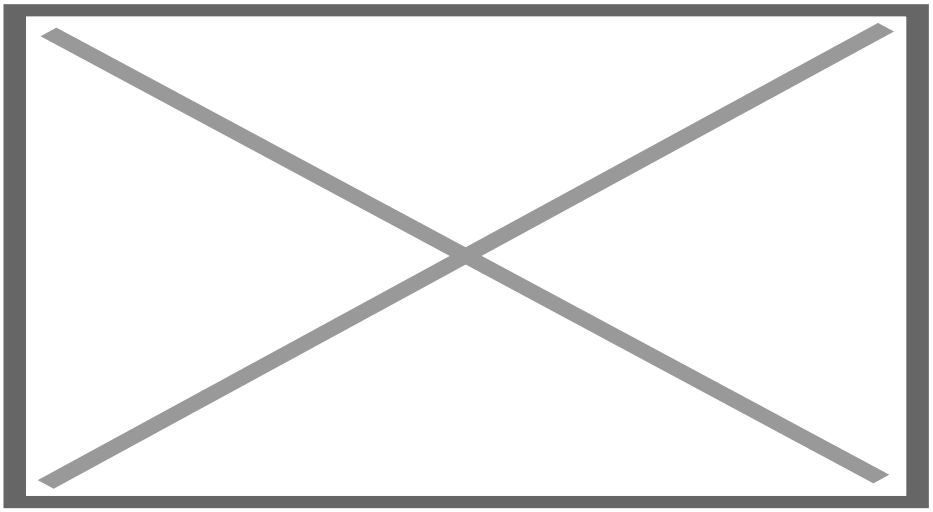
The master's program outline highlights the distribution between compulsory and optional modules.

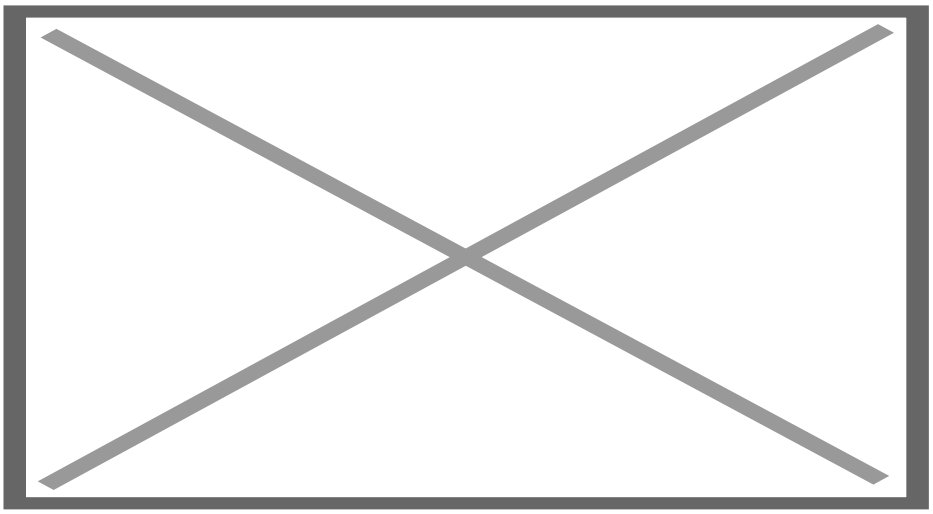
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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

The skills to be acquired in the Master's programme in ‘Materials, Structures and Energy for Sustainable Construction’ are:

- Modelling, simulating and experimenting to understand scientific and technological issues.
- Developing an approach to analysing and designing complex sustainable systems in the field of civil engineering in their environment.
- Knowing how to develop one's own skills in a cross-disciplinary or in-depth manner.
- Organising and leading an individual or collective project.
- Effectively exchanging, transmitting and disseminating knowledge.

These skills will begin to be developed during the first year of the Master's programme and will be further developed during the second year.

Objectives

The first year of the Master's degree in ‘Materials, Structures and Energy for Sustainable Construction’ focuses on teaching through and by research. The study context is civil engineering, with a particular focus on the various scientific, technical and environmental issues related to the construction sector. This first year aims to provide students with in-depth scientific knowledge in a number of fields, as well as a strong cultural understanding of the specificities of civil engineering: construction processes, comfort, durability of materials used in the sector, energy performance, etc.

The in-depth scientific and technical culture allows students to pursue, according to their personal plans, careers in research, R&D engineering or higher education after obtaining a Master's 2 degree. In addition, the proximity of the Paris-Saclay Mechanics Laboratory (LMPS) encourages early immersion in the world of research from the first year of the Master's programme.

The two semesters are deliberately designed to be generalist, based on core, major and advanced modules. This provides a broad disciplinary foundation from which to approach the specialisation that will be undertaken in the second year of the Master's programme in an informed manner.

The core modules aim to provide students with the digital, experimental and theoretical tools necessary to solve complex problems. The specialised modules aim to consolidate these theoretical foundations and add colour to the students' courses in several areas: disciplinary, digital, theoretical and experimental. Finally, advanced modules allow students to begin planning for the next stage of their education, which will be pursued in a Master's 2 programme.

More specifically, the concepts mastered at the end of the programme will be:

- Tools for modelling physical phenomena: mechanics of solid and fluid continuous media, wave propagation, vibrations, etc.
- Basic tools for describing the behaviour of materials and their applications: elasticity, damage, plasticity, fatigue, creep, relaxation, etc.
- Concepts and tools for describing the energy and environmental behaviour of buildings: building thermal and acoustic properties, energy systems, sustainable development, etc.
- Numerical tools: finite element method, algorithms for solving non-linear problems, use of simulation software, coupled physics problems, etc.
- Concepts and tools for describing construction techniques: site organisation and planning, construction economics, etc.

Débouchés

Career prospects

Secondary school teacher
Lecturer (after a PhD)
Teacher (after the CAPES or 'agrégation' competitive exam)
Research Engineer

Further Study Opportunities

Students in this track can turn to research at the end of the 2nd year Master's.

Calendar

Start of programme (indicative date)
26/08/2026
End of programme (indicative date)
23/08/2027
Admission

Admission Route

Physics
Mechanics
Civil Engineering
Science and Technology
Engineering Sciences

Capacity

Available Places

24

Target Audience and Entry Requirements

Students admitted to the M1 Civil Engineering programme must have the following profile:

- Have completed and validated a SAPHIRE-type bachelor's degree offered by ENS Paris-Saclay: https://genie-civil.ens-paris-saclay.fr/formations/ldd3-sciences-pour-lingenieur
- Have completed and validated a **bachelor's degree with a major in engineering science or solid-state physics**, developing in-depth skills in:
    - Mathematics for engineers,
    - Numerical methods,
    - Structural mechanics,
    - Materials,

- Fluid mechanics,
- Mass and heat transfer.

Période(s) de candidature

Inception Platform

From 15/01/2026 to 16/03/2026

MonMaster Platform

From February 17th to March 16th, 2026

To find out which platform you should apply through, please see the Masters' applications and enrolment page.

Supporting documents

Compulsory supporting documents

Rank of previous year and size of the promotion.

Motivation letter.

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Certificate of French (compulsory for non-French speakers).

Curriculum Vitae.

Recommendation letters.

Selection sheet completed.

À partir de la maquette, indiquez la coloration et les modules que vous souhaitez suivre.

Additional supporting documents

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class

Tronc commun S1

Méthode des éléments finis linéaires	2	Semestre 1	8	4	8
Charger le détail					
Mécanique des milieux continus non simples	2	Semestre 1	12	8	
Charger le détail					
Matériaux cimentaires : hétérogénéité et durabilité des ouvrages	3	Semestre 1	14	6	4
Charger le détail					
Enjeux du développement soutenable en Génie Civil	2	Semestre 1	8		
Charger le détail					
MMC Fluides - Site ENS	3	Semestre 1	14	16	
Charger le détail					
Méthodes Numériques pour les équations aux dérivées partielles - Site ENS	3	Semestre 1	14	8	8
Charger le détail					
Vibrations dans les solides	3	Semestre 1	10	10	10
Charger le détail					
Anglais	3	Semestre 1	20		
Charger le détail					

Dominante S1 (choix : 3/6)

Grandes transformations et instabilités des structures élancées	3	Semestre 1	12	4	8
Charger le détail					
Génie sismique	3	Semestre 1	10	6	8
Charger le détail					
Structures du patrimoine	3	Semestre 1	10		14
Charger le détail					
Systèmes énergétiques	3	Semestre 1	8	8	8
Charger le détail					
Enveloppe à haute efficacité énergétique	3	Semestre 1	8	8	8
Charger le détail					
Énergie renouvelable intégrée au bâtiment	3	Semestre 1	8	8	8
Charger le détail					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Tronc commun S2								
Ondes et acoustique physique	2	Semestre 2	10	4	6			
Charger le détail								
Théories des lois de comportement multiaxiales	2	Semestre 2	10	10				
Charger le détail								
Méthodes de construction	2	Semestre 2	7	8				
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Optimisation et apprentissage profond	2	Semestre 2	12	4	8			
Charger le détail								
Dominante S2 (choix : 2/4)								
Mécanique des sols	3	Semestre 2	8	8	8			
Charger le détail								
Modélisation des constructions	3	Semestre 2	10	8	6			
Charger le détail								
Acoustique des salles	3	Semestre 2	8	10	6			
Charger le détail								
Thermo-aéraulique des bâtiments	3	Semestre 2	8	8	8			
Charger le détail								
Approfondissement S2 (choix : 2/6)								
Caractérisation géophysique de la subsurface	2	Semestre 2	10	2	8			
Charger le détail								
Simulation de problèmes couplés	2	Semestre 2	4		16			
Charger le détail								
Développements expérimentaux	2	Semestre 2	4		16			
Charger le détail								
Outils pour la modélisation des (géo-)matériaux	2	Semestre 2	20					
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Qualité de l’air Intérieur / Extérieur	2	Semestre 2	10	6	4			
Charger le détail								
Connaissance et manque de connaissance en génie civil	2	Semestre 2	8	6				
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learni cours
Stage	12	Semestre 2							
Charger le détail									

Teaching Location(s)

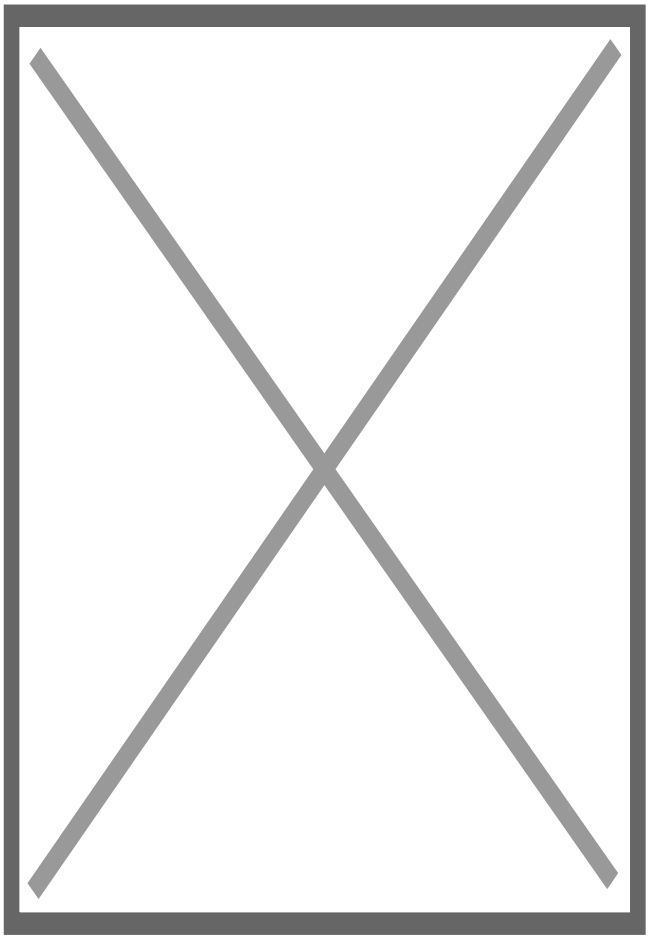
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Academic Partner(s)

DER génie mécanique de l'ENS Paris-Saclay / DER anglais de l'ENS Paris-Saclay / Université d'Evry

Training campus

Javascript est requis pour visualiser cette carte.



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Bus 4606 / 4609 / 4611 / 5154
RER B Le guichet
Voir
Student restaurant (CROUS)
Library
Sports facilities
Student residence

Contact

- **Clotilde CHAMBREUIL**

http://www.universite-paris-saclay.fr/formation/master/genie-civil/m1-materiaux-structures-et-energies-pour-une-construction-soutenable