Université Paris-Saclay
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M2 Dynamique des Fluides et Energétique

Master's degree
Specialisations Mechanics | Physique fondamentale et applications
Language(s) of instruction
French

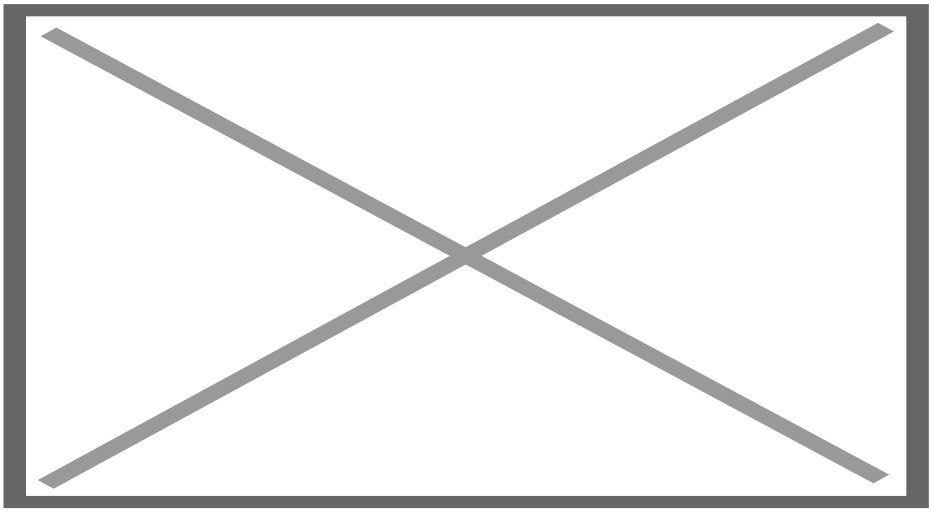
The Master’s program Fluid Dynamics and Energy at Université Paris-Saclay prepares students for careers in engineering and fundamental research in fields where fluid mechanics and heat transfer play a central role: renewable energies, transportation, industrial processes, climate, and the environment.

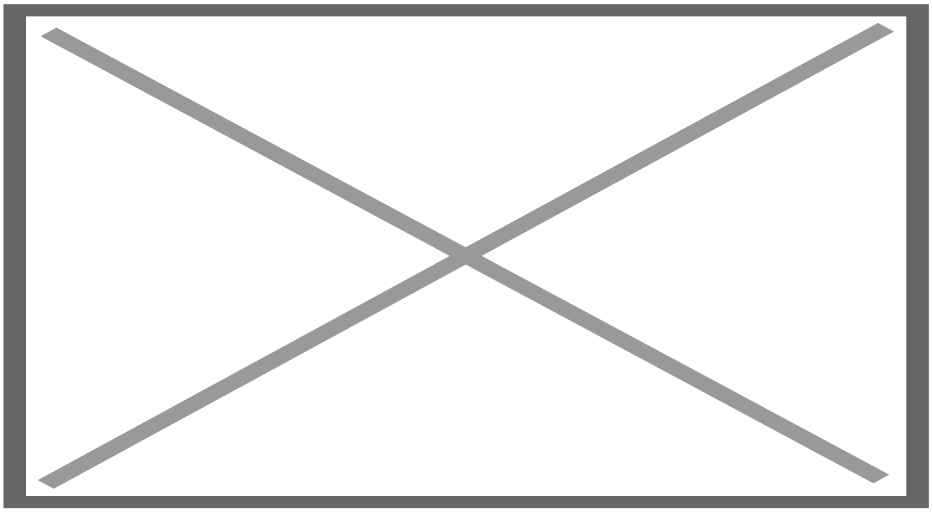
The academic year is structured into a coursework semester (S3, 30 credits) and an internship semester (S4, 30 credits), carried out either in a research laboratory or in industry.

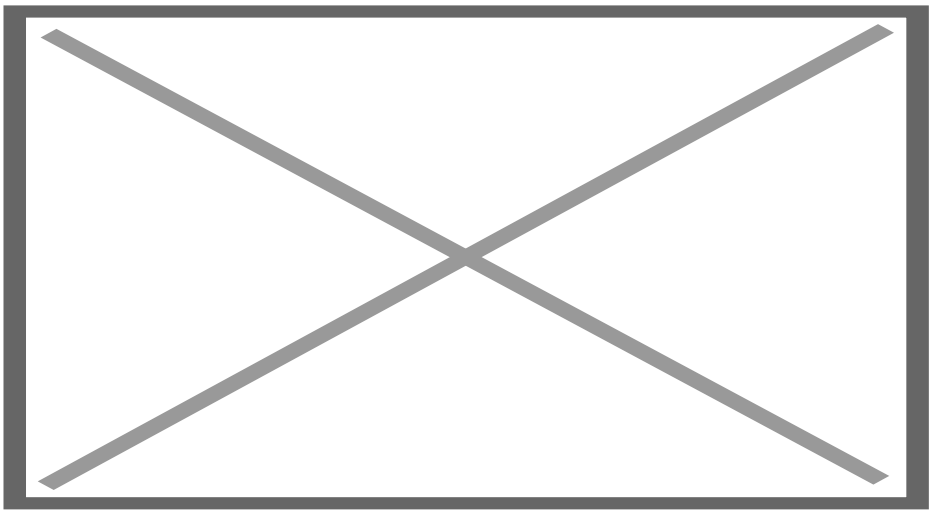
Semester S3 is divided into two 10-week periods, A and B. Each period consists of 8 weeks of lectures, 1 revision week, and 1 examination week.

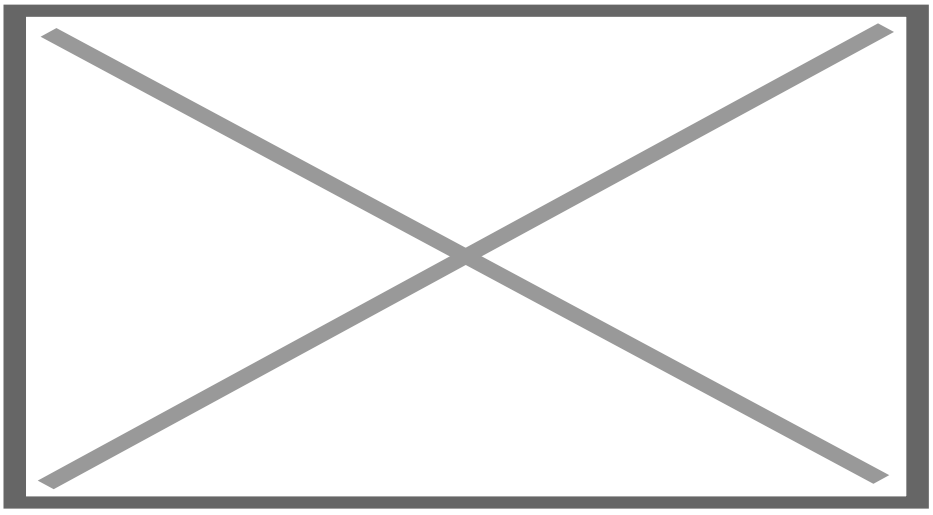
For each period, students must select a set of teaching units (UEs), including at most one elective unit outside the Master 2 Fluid Dynamics and Energy. The total credits from the chosen UEs must equal 30. The year is validated upon completion of 30 credits from coursework and 30 credits from the internship.

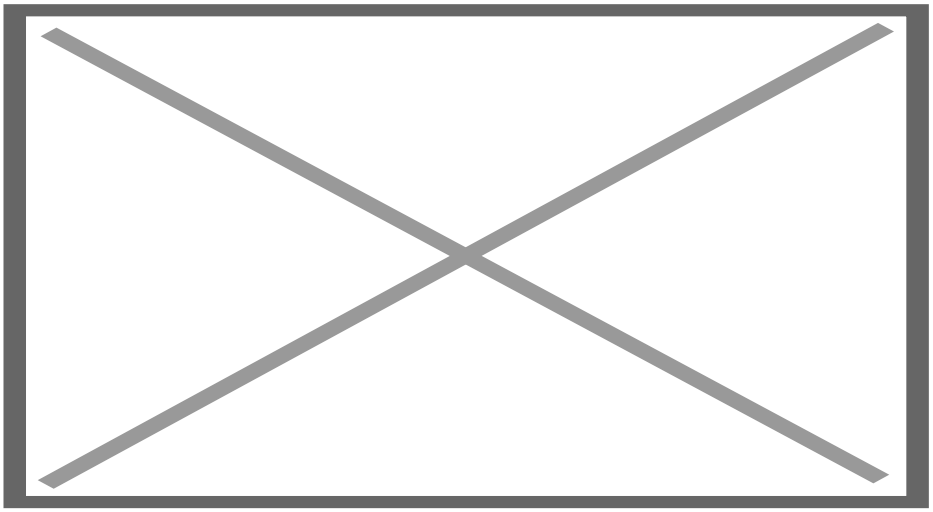
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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

• Independently formulate a fluid mechanics and heat-transfer problem to achieve a given objective, from modelling the system and loads to specifying boundary conditions, and propose an associated solution strategy.
• Apply theoretical and practical concepts to understand a problem and derive its mathematical formulation.
• Implement problem-solving tools — analytical, numerical or experimental — at a proficient level: justify the choice of existing tools or develop bespoke tools, and perform a critical analysis of results.
• Design and optimize an innovative scientific or technological solution (product or experimental protocol) with a view to research or development.
• Communicate clearly and concisely, in writing and orally, scientifically argued results and interpretations for dissemination and exploitation by the scientific or professional community.
• Successfully carry out an individual or team project in organisational and interpersonal terms (coordination, project management, critical perspective, teamwork, autonomy, responsibility, initiative).

Objectives

The Master’s program Fluid Dynamics and Energy (second year) combines both fundamental and applied approaches, training students in key concepts of fluid mechanics and heat transfer, as well as in modern numerical and experimental tools used in research laboratories and industry.

Fluid mechanics and heat transfer are central to numerous fields directly connected to major societal challenges such as energy efficiency and the development of renewable energies. These challenges arise in transportation (aeronautics, automotive), energy production (wind, tidal, nuclear), building engineering, industrial processes (food industry), and healthcare (microfluidics). Beyond these applications, fluid mechanics also represents a highly active field of fundamental research in Earth sciences, astrophysics, and life sciences.

The strengths of this Master’s program lie in the strong coupling between mechanics and physics, and in the balance between experimental, numerical, and theoretical approaches. The program aims to prepare students for cutting-edge research topics in complex fluids and dispersed media, turbulence, aerodynamics and flow control, and magnetohydrodynamics. Special emphasis is placed on mastering numerical tools—particularly CFD (Computational Fluid Dynamics) software for fluid mechanics and heat transfer—as well as advanced diagnostic techniques in fluid mechanics, which are in high demand in the R&D departments of major companies.

Débouchés

Career prospects

After a Master's or Master's + PhD: engineer (R&D, control, production, etc.)
After a Master's or Master's + PhD: researcher or lecturer
After a Master's or Master's + PhD: engineer (Research & Development, control, production, etc.)
R&D Engineer
Nuclear R&D Engineer
R&D Project Manager
R and D Project Manager
Project Manager
Design engineer in the industrial sector
Design engineer in the research / scientific sector
Academic staff
Design Engineer
Research & Development Engineer
Secondary school teacher
Research & Development Engineer
Research or Design Engineer

Research professions
Lecturer (after a PhD)
Design Engineer
Research Engineer
Teacher (after the CAPES or 'agrégation' competitive exam)
Design Engineer
Research Engineer
Development Engineer
Scientific expertise coordinator

Further Study Opportunities

R&D researcher or data modelling and analysis expert in leading-edge companies or laboratories.
PhD
Engineering, research and development
Students in this track can turn to research at the end of the 2nd year Master's.
Students with a 2nd year Master's degree have the possibility to pursue doctoral research.

Calendar

Start of programme (indicative date)
24/04/2026
End of programme (indicative date)
05/03/2027
Admission

Admission Route

Physics
Mechanics

Capacity

Available Places

30

Target Audience and Entry Requirements

First-year students from the Master’s programs in Mechanics, Physics, and Energy at Université Paris-Saclay are admitted based on application and interview.
Students holding a Master’s degree in Mechanics, Physics, Energy, or Applied Mathematics from other universities or engineering schools may also apply to this second-year Master’s program.

Période(s) de candidature

Inception Platform

From 01/04/2026 to 22/06/2026

Supporting documents

Compulsory supporting documents

Motivation letter.

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

Curriculum Vitae.

Additional supporting documents

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

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

Document indicating the list of local M2 choices available here : https://urlz.fr/i3Lo.

Supporting documents :
- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	dir study/ c
M2 DFE, UE à 3 ECTS								
Aérodynamique Charger le détail	3	Semestre 1	15	15				
Ecoulements interfaciaux et fluides complexes Charger le détail	3	Semestre 1	11	11	8			
Fluides et grains Charger le détail	3	Semestre 1	20	10				
Hydrodynamique avancée Charger le détail	3	Semestre 1	15	15				
Instabilités hydrodynamiques Charger le détail	3	Semestre 1	15	15				
Magnétohydrodynamique Charger le détail	3	Semestre 1	15	15				
Techniques expérimentales avancées en mécanique des fluides Charger le détail	3	Semestre 1	15		16			
Thermique Charger le détail	3	Semestre 1	15	15				
Turbulence Charger le détail	3	Semestre 1	15	15				
Volumes Finis Charger le détail	3	Semestre 1	10	10	10			
Projet Charger le détail	3	Semestre 1						

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	dir study/ c
UE libre Catalogue S1	2.5	Semestre 1						
Charger le détail								
M2 DFE, UE à 1,5 et 4,5 ECTS								
Calcul haute performance	1.5	Semestre 1	9	6				
Charger le détail								
Energies éoliennes et marines	1.5	Semestre 1	6	6	4			
Charger le détail								
Logiciels de simulation CFD	4.5	Semestre 1	6					
Charger le détail								
Machine Learning pour la Mécanique des Fluides	1.5	Semestre 1	9	6				
Charger le détail								
Micro- et bio- fluidique	1.5	Semestre 1	12		4			
Charger le détail								

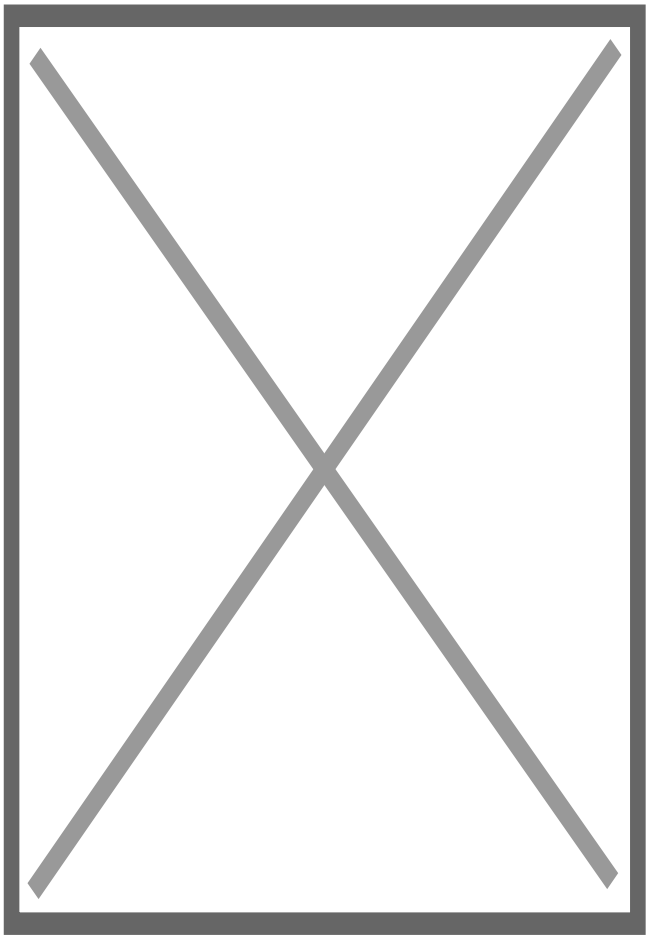
Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learni cours
Stage M2 DFE	30	Semestre 2							
Charger le détail									

Teaching Location(s)

ORSAY

Training campus

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Saclay Moulon

Saclay / Gif-sur-Yvette / Orsay
Bus 4606 / 4609 / 4611 / 5154
RER B Le guichet
Voir
Student restaurant (CROUS)
Library
Sports facilities
Student residence

Contact

- **Nicolas Grenier**

  Responsable de formation
- **Frédéric MOISY**

  Responsable de formation

http://www.universite-paris-saclay.fr/formation/master/mecanique/m2-dynamique-des-fluides-et-energetique