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M2 Géologie des bassins sédimentaires

Master's degree
Specialisation Earth and Planetary Sciences, Environment (STePE)
Enrolment type
Formation initiale
Formation continue
Language(s) of instruction
French

The Master's program in "Geology of sedimentary basin" trains experts capable of addressing the challenges of the energy transition. Combining theory, practical work, field work, and 3D modeling, it develops key skills in the exploration of sedimentary basin ressources (geothermal energy, CO2 storage, hydrogen). Supported by leading academic and industrial partnerships, this Master offers a unique immersion in research and innovation and paves the way to carrers in academia (PhD) or industry.

The program consists of 10 course units (3 ECTS each, for a total of 30 ECTS) and a final internship (30 ECTS). It is structured around 4 blocks of skills and knowledge:

1. Sedimentary basins and reservoirs: from diagenesis to static and dynamic modeling – 3 courses
2. Observing and analyzing basins – 2 courses
3. Societal challenges and scientific culture – 3 courses, including 2 electives
4. Professional practice of scientific research – 2 courses + research internship (30 ECTS)

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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

- Work sustainably on the exploration and development of low-carbon subsurface energy resources (geothermal, H?) and mineral resources (Li, U, F), as well as on implementing solutions for CO? sequestration and radioactive waste storage.
- Build strong expertise in field geology and master modeling tools (geomodeling), mineralogical tools (SEM, XRD), and geochemical tools (ICP-MS).
- Master and apply advanced knowledge of basin geology and its applications to the energy transition.
- Mobilize methodological, technical, and practical skills to solve problems in basin geology.
- Conceptualize, structure, and conduct a geoscience project, and critically analyze results.
- Develop autonomy in learning and action.
- Work effectively in teams and collaborate to achieve common goals.
- Synthesize and communicate effectively in French and English, adapting messages to the target audience.

Objectives

The two main objectives of the Master’s program Sedimentary Basin Geology are to train:

- geologists specialized in sedimentary basins, mastering field geology as well as modeling tools (geomodeling), mineralogical tools (SEM, XRD), and geochemical tools (ICP-MS);
- geologists able to work sustainably on the exploration and development of low-carbon subsurface energy resources (geothermal energy, hydrogen), mineral resources (Li, U, F), and to design solutions for CO? sequestration or radioactive waste storage in the subsurface.

More specifically, the objectives of the second year of the Master’s program Sedimentary Basin Geology are to:

- prepare students to address major societal challenges, with a focus on sedimentary basins and their uses in the energy transition;
- develop advanced skills in basin dynamics and architecture, their complex geological evolution, diagenesis, the formation of mineral and energy resources, as well as 3D modeling of reservoir properties and fluid flow;
- provide a comprehensive and practical training, including exploration for the new uses of sedimentary basins;
- encourage collaboration with the Master’s program 3G – Georesources, Geohazards, Geotechnics at the University of Lille (Geological Engineering track, “Geothermal–Reservoir” specialization), in order to foster exchanges between two major national programs, notably through a joint field trip;
- offer project-based learning units (case studies, 3D and flow modeling, fieldwork, diagenesis) to promote immersion in research, training in report writing, data analysis and interpretation, and oral presentation of results, including in English;
- develop complementary skills in methodologies such as geochronology and geochemistry, as well as broader topics in geosciences such as energy, the carbon cycle, soils, and paleoclimates.

Débouchés

Career prospects

After a Master's + PhD: researcher or lecturer
Data Manager
Local Administration
Engineering firms specialising in environmental impact assessments
Laboratory Manager
Research professions
Head of mission / projects
Design Engineer
Research Engineer
Research officer
PhD candidate
R&D engineer

Further Study Opportunities

PhD thesis
Students with a 2nd year Master's degree have the possibility to pursue doctoral research.
In particular, this track prepares students for applied research activities, usually undertaken after a PhD, whether in academia or in R&D.
R&D researcher or data modelling and analysis expert in leading-edge companies or laboratories.

Admission

Admission Route

Earth Sciences
Life and Earth Sciences

Capacity

Available Places

8

Target Audience and Entry Requirements

Students wishing to enroll in this second-year Master's program may apply through the first-year Master's *"Geosciences: Water, Soils, and Basins"* at Université Paris-Saclay, or come from other Master's programs or engineering schools. Applicants are expected to have strong skills in sedimentary basin geology, sedimentology, drilling and well logging, geothermal energy, as well as field geology. Additional knowledge in geochemistry, mineralogy, petrography, geochronology, geodynamics, and diagenesis will be considered an asset for successfully following the different teaching units (UE).

Période(s) de candidature

Inception Platform

From 26/05/2026 to 08/07/2026

Supporting documents

Compulsory supporting documents

Copy of the last diploma.

Copy of identity document.

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).

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	directed study/practical class	d l
Diagenèse	3	Semestre 1	9	15					
Charger le détail									
Modélisation géologique 3D des réservoirs géothermiques et des sites de stockages	3	Semestre 1							
Charger le détail									
Modélisation d'écoulement	3	Semestre 1			15				
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Stage de terrain "Géologie des bassins"	3	Semestre 1			36			
Charger le détail								
Méthodes d'analyses pour les Sciences de la Terre et de l'Environnement	3	Semestre 1						
Charger le détail								

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

UEs obligatoires

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Emissions ne?gatives et ge?o-inge?nierie	3	Semestre 1	18	6				
Charger le détail								
Énergie, stockage, ressources et droit de l'environnement	3	Semestre 1						
Charger le détail								
UE optionnelle								
Géochimie des enveloppes superficielles	3	Semestre 1	18	9				
Charger le détail								
Physicochimie des sols	3	Semestre 1	13.5	10.5				
Charger le détail								
Géo-énergie: Géothermie et réservoirs	3	Semestre 1	9		21			
Charger le détail								
Cycles du carbone présent et passé	3	Semestre 1	18	9				
Charger le détail								
UE libre Catalogue S1	2.5	Semestre 1						
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learni cour
Stage de recherche	30	Semestre 2							
Charger le détail									
Projet - Étude de cas	3	Semestre 1	3						

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learni cour
Charger le détail									
Anglais	3	Semestre 1	20						
Charger le détail									

Teaching Location(s)

ORSAY
GIF SUR YVETTE
LILLE
PALAISEAU

Academic Partner(s)

Une des spécificités et originalités de notre Master est le partenariat avec le Master « 3G » Géoressources, Géorisques, Géotechnique de l'Université de Lille, Parcours Géologie de l'ingénieur (GEOLIN) axe « géothermie-réservoir », avec la mutualisation de trois unités d'enseignement (stage de terrain, modélisation d'écoulement et Diagenèse). Le stage de terrain d'une semaine (Alpes, Bassin de Lodève, Est de la France) alternant selon les années, ainsi que le transport et le logement à l'Université de Lille (UE modélisation d'écoulement) pendant une semaine sont financés par l'Université Paris-Saclay dans le cadre du partenariat.

Training campus

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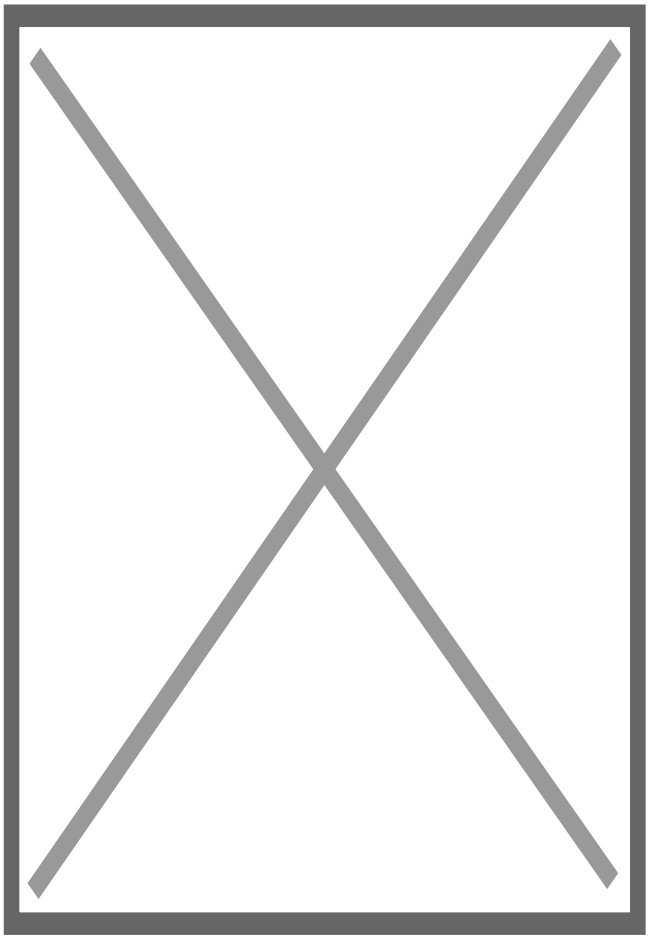

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Contact

- **Benjamin Brigaud**

http://www.universite-paris-saclay.fr/formation/master/sciences-de-la-terre-et-des-planetes-environnement/m2-geologie-des-bassins-sedimentaires