SCIENCE, TECHNOLOGY, HEALTH

GREEN Graduate Program - Mathematics, Modeling and Applications to Energy and Environment (M2A2E)

Master Mathematics and Applications

ECTS
120 credits

Duration
2 years

Component
Collège Sciences et Technologies pour l'Energie et l'Environnement (STEE)

Language(s)
English

Presentation

In 2022, the University of Pau and Pays de l'Adour opened a 5-year Master's degree + PhD program of excellence **in a variety of disciplines linked to energy and environmental research, the GRaduate School for Energy and Environmental iNnovation (GREEN).**

Every student accepted into the program will be offered a €5,000 stipend per year for the first two years.

Apply here from October to March

N.B. Our Master's programs may not open if enrollment is too low.

The **Mathematics, Modeling, and Applications to Energy and Environement research graduate program** aims to form experts with up-to-date knowledge of advanced skills in Applied Mathematics, Statistical and Machine Learning Methods, and Scientific Computing to elaborate, analyze, and simulate mathematical models arising from issues and predicted impacts in energy and environment.

Several key challenges are addressed in this program, such as:

* Elaboration of complex and accurate mathematical models arising in energy and environment,
* Optimization, combination, and implementation of advanced simulation methods associated with computer tools.

This degree offers multidisciplinary key courses to achieve an advanced specialist level in all areas involving mathematical modeling (deterministic and stochastic) and numerical simulation. It is suited for students planning both an academic or an industrial career and provides the theoretical basis and the practical expertise required to pursue academic research or R&D structures.

The program is carried out in close collaboration with the LMAP - Laboratory of Mathematics and its Applications in Pau.

Objectives

* To contribute to the development and use of renewable energies and sustainable development, through fine mathematical and numerical modeling of the physical phenomena involved at different scales.
* To train top-level students for careers in academic or private research in applied mathematics in the scope of major energy and environmental challenges.
* To train students to develop cutting-edge mathematical and computational skills to deal with complex problems in industry and design offices.

Your university

Skills

At the end of the training, the students will be able to :

* Carry out initial research in applied mathematics at LMAP, in line with major energy and environmental issues and challenges.
* Solve problems to develop new knowledge and procedures, and integrate knowledge from different fields
* Make innovative contributions in the context of high-profile exchanges, and international contexts in connection with energy and environmental issues.
* Conduct a reflective and distanced analysis, taking into account the stakes, issues, and complexity of the problem under study
* Understand and analyze energy and environmental problems from the point of view of numerical modeling.

In particular, he/she will be able to demonstrate advanced interdisciplinary skills:

* Deterministic or stochastic modeling of the problems under consideration
* Numerical simulation and computer implementation of established models
* Optimization of underlying algorithms to deal more effectively with problems involving large and/or complex data sets
* Statistical processing of large and complex data flows for decision support and reliability.

Additional information

* Training in English
* More than one-third of credit hours acquired in research
* Integrating research laboratories right from the 1st semester
* Student-centered learning
* Multidisciplinarity
* Post-graduate studies with a PhD thesis - if the criteria of excellence are met
* Tutorship and tailor-made programs: each student will have a tutor with whom she/he will build her/his curriculum related to his aspirations and research interests. The tutor will also help the student define a series of face-to-face or e-learning courses (up to 20 or 25% for the Science graduate program) that s/he can easily keep up with.

Contact

The International Master Programs Admissions Office

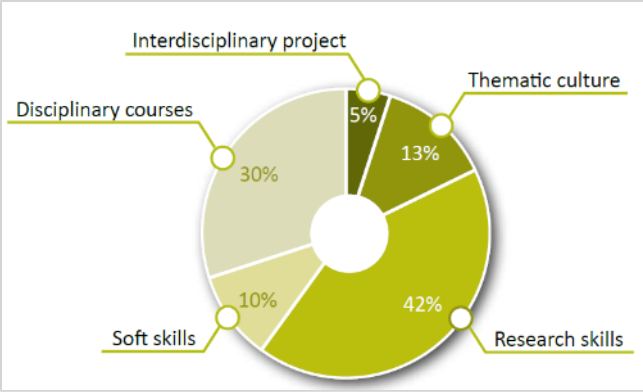
Organisation

Organization

Interdisciplinarity and research immersion in laboratories

To promote transversal and interdisciplinary activities, all the Graduate Programs proposed by GREEN are identically structured. In addition to the research training which represents 40% of a Master's credits, the courses offered in each program are a combination of standard thematic culture courses in the field of Energy and Environment (Sustainability Science, Resilience Alliance, Ecological

Economics, and Political Ecology, Health & Ecotoxicology, Energy Law & Policy…) and essential soft skills completed by fundamental and specialized disciplinary courses to fit with the research or topic interest of the students.



Training by project

The research-based training program of our GREEN project follows the active educational approach of "student-based learning". The aim is to guide our students and help them structure their research and innovation projects while giving them a great deal of autonomy.

In the second year, there is therefore a significant reduction in the number of face-to-face courses in favor of project-based learning, to put students in a professional situation so that they can experiment with group work and project management. This framework encourages strong interaction between students, lecturers, and researchers to ensure easier integration into the host research laboratories. The interdisciplinary project proposed in the third semester should give students from all the graduate programs an opportunity to produce joint, multidisciplinary work.

Semester 1 Electives	ECTS (16)
Numerical analysis of partial differential equations (PDEs).	4
Optimization	4
Scientific Computation with Python	4
Statistical Inference	4
Probability Calculus	4
Hilbert Space	4
Analysis of PDE	4

Semester 2	ECTS (10)
Electives 1	**6**
Advanced Analysis	6
Linear Model	6
Markov Chains	6
Electives 2	**4**
Scientific Computing	4
Monte Carlo Methods	4
Advanced Analysis of PDEs	4

Semester 3 Electives	ECTS (6)
Mathematical Engineering for Machine Learning	6
Advanced Numerical Analysis	6

Advanced Analysis of PDEs 2	6

ECTS: Eureopean Credit Transfer System

Admission

Admission requirements

This Master's degree will select excellent students who hold a Bachelor's degree and who wish to be researchers in the field of sustainability sciences.

* Applicants must hold a Bachelor's (Science or Engineering) in Mathematics or equivalent. Strong eagerness to research is mandatory.

English language requirements

* Applicants must be comfortable in English, both in writing and speaking.
* A non-native English candidate must pass an internationally recognized English test or an English interview with our lecturers.
* Minimum required score CECRL **B1** level in English.

How to apply

Apply here from October to March

Useful info

Contacts

Coordinator

Jacques Giacomoni
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Administration contact

Admission office - Mathematics
0559407575
secrétariat-mathématiques@univ-pau.fr

Partner laboratories

LMAP
https://lma-umr5142.univ-pau.fr/fr/index.html

Campus

Pau