



SCIENCE, TECHNOLOGY, HEALTH

# M2 Molecular Biology and Environmental Microbiology

Master Chemistry and Life sciences



ECTS  
60 credits



Duration  
1 year



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



Language(s)  
English

## Presentation


Increasingly strong societal demand in the fields of the Environment, sustainable development, and health now call for a synergy of cutting-edge skills involving Chemical and Biological Sciences.

[Apply here from October to March](#)

The Master's degree in **Molecular biology and Environmental Microbiology** trains specialists with a mastery of modern **molecular biology** and **environmental microbiology**, with a solid background in **chemistry**, capable of grasping environmental issues related to:

- \* The protection of **ecosystems**,
- \* The ecotoxicology of soils, sediments, and water,
- \* The identification of microorganisms representing a risk to the environment or public health,
- \* The bio-rehabilitation of sites affected by anthropogenic (industrial and agricultural) pollution.

The **Molecular Biology and Environmental Microbiology** Master's degree is at the heart of this technological and socioeconomic evolution. At a meeting point between the professional world and the University in a region that is home to large-scale facilities of several industrial companies concerned by bio-decontamination (Total,

Arkema, chemical industries at the [Lacq site](#) | ) and strong agricultural activity.

Biological methods developed for the remediation of contaminated sites, the treatment of effluents, the control of the use of phytosanitary products, or the search for pathogens in natural waters and cooling or water distribution systems are increasingly in demand and proposed as necessary alternatives for sustainable improvement of environmental problems.

The implementation of these methods as well as the development of molecular analysis tools and techniques (quantitative PCR, DNA chips, high-throughput sequencing, bioinformatics analysis, microbial biosensors, GMOs, and protein engineering) is one of the challenges for industrial and environmental policies in the coming years.

An orientation toward research may be envisaged, depending on the choice of options and especially internships.

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## Objectives

Taught in English, the first semester is devoted to theoretical and practical teaching by teacher-researchers, supplemented by conferences in which professionals from the sector share their experience in the field, as well as



visits to companies. The course is mainly taught through project-based scenarios.

The second semester consists of an internship of 4 to 6 months in a company, a professional organization, or an academic research laboratory.

## Your university

## Skills

**At the end of this course, graduates will develop the following skills according to their choice of optional courses:**

- Identify the concepts and approaches of modern microbiology and biology,
  - \* Understand the complexity and importance of microbial processes in the environment,
  - \* Master modern biochemical, molecular, and genetic methodologies, as well as mathematical, statistical, and computer bioinformatic tools,
  - \* Search for pathogens in natural environments and industrial installations or select micro-organisms likely to degrade contaminants of biotic or abiotic origin in the laboratory or in the natural environment,
  - \* Conduct experiments to evaluate the effectiveness of biological or chemical methods of environmental remediation,
  - \* Conduct studies and formulate opinions to solve practical problems posed by the protection of ecosystems: assessing the benefit-risk of the methods used, setting up field study protocols,
  - \* Conduct field experiments to evaluate the effectiveness of chemical or biological methods for the protection of eco- and agrosystems.



## Additional information

### Key assets

- \* **Open to a Work and Study Program.**

- \* **Dual degree with a "Master in Biotechnology of Environment and Health" from the University of Oviedo (Spain).**

### Scholarships

- \* EIFFEL Scholarship of Excellence
- \* Talents' Academy Grants | 
- \* Catalogue des Bourses Campus France | 

The International Master Programs Admission Office

[master.programs@univ-pau.fr](mailto:master.programs@univ-pau.fr)



## Organisation

### Organization

SEMESTER 1 from September to January		
Mandatory courses		
Field	Course	ECTS
Language	* English or French as a Foreign Language	2
Data analysis	* Statistical tools-project	4
Molecular biology and environmental microbiology	* Molecular Biology Technological applications (EC3) (6.0 crédits ECTS)	6 2 4



	<ul style="list-style-type: none"> <li>* Microbial biotransformations and environmental applications - conferences (EC1) (2.0 crédits ECTS)</li> <li>* Microbial biotransformations and environmental applications - project (EC2) (4.0 crédits ECTS)</li> </ul>	
	<b>Electives: choose for 10 ECTS</b>	<b>ECTS</b>
Quality	* Quality assurance for analysis	2
Environmental Chemistry	* Trace element biogeochemical cycles	2
	* Speciation concepts and analysis	2
	* Biological Macromolecules Characterization	2
	* Imaging techniques for environmental	2

	samples and materials characterization	
Ecology	Molecular Ecology (2.0 crédits ECTS)	2
Biotechnology	Trends and challenges in microbiology   	2
Water	Water treatment: Lab work on Biological water treatments (EC3) (2.0 crédits ECTS)	2
Health	HSE   	2
Group project	Environmental engineering project	4

SEMESTER 2 From January to June		
Fields	Course title	ECTS
Internship	- Internship	20



Bibliography	- Bibliographic research	10
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**None:** French language courses are included in the formation.

For any additional information or questions related to the application, please contact:

[beatrice.lauga@univ-pau.fr](mailto:beatrice.lauga@univ-pau.fr)

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## Assessment method

- \* Final exams
- \* Ongoing assessments
- \* Oral presentations

## Admission

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### Admission requirements

#### Academic requirements

Applicants must hold at least a 4-year university level in chemistry and/or biology fields.

The M2 MBEM is open to students who have completed an M1 (4-year degree) in "Molecular Biology and microbiology for the environment" (BME) or an equivalent level.

For students outside the UPPA, integration in the second year is subjected to a selection of curricula with equivalent training levels and sufficient skills in biology, chemistry, and environment (Molecular biology, bioinformatics, microbiology, environmental microbiology, ecotoxicology, biostatistics, field sampling, and data processing, physical-chemistry, analytical chemistry, environment).

#### English Language Requirements

Applicants must be fluent in English, both in writing and speaking. An applicant whose native language is not English has to take a recognized international English test.

**Minimum required score:** CECRL B2 | 🇬🇧 level in English

#### French Language Requirements

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## How to apply

Apply here from October to March

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## Tuition Fees and partial exemptions

Administrative tuition in France is determined at a national level. The French Ministerial Order of April 19, 2019, amended on June 9, 2020, sets university tuition for a Master's Program as follows: European nationals: **€243**, extra-European nationals: **€3770**.

The Board of Directors has extended its policy of automatically providing a **partial reduction of these fees at the UPPA**. As a result, extra-European nationals will be granted automatic partial reductions such that **they will be able to pay the same enrollment fees as European nationals**.

#### Extra fees:

In addition to academic tuition, most students must pay a student body fee (CVEC, which costs around €100 in 2020-2021).

*NB: Admitted candidates in any course of study who have taken a break of more than two years from their studies will enroll via the UPPA's **Continuing Education service** (Formation Continue / FORCO). They are exempt from the CVEC, however, they may be subject to a different tuition scale.*

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## Student capacity



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## And after

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### Further studies

#### Sectors

- \* Environment
- \* Agribusiness
- \* Biotechnology
- \* Life sciences


#### Fields

- \* Research and Development
- \* Quality control

#### Positions

- \* Academic positions
- \* Researchers (public or private)
- \* Research and Innovation Engineers

## Professional insertion

For more information about the outlooks after graduation, check the following document in French [Here](#) | 

## Useful info

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### Contacts

Béatrice LAUGA

✉ [beatrice.lauga@univ-pau.fr](mailto:beatrice.lauga@univ-pau.fr)

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### Partner laboratories

IPREM

 <https://iprem.univ-pau.fr/fr/index.html>

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### Place

 Pau

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### Campus

 Pau