

Detailed Program Facts

ACADEMIC YEAR : Our full academic year runs from September to September

APPLICATION DEADLINE : Applications are open from November to April

HOW TO APPLY : The application documents must be uploaded on the website : <http://www.univ-pau.fr/en/apply-now>

PROGRAM INTENSITY: Full-time

DURATION: 1 year

CREDITS: 60 ECTS

LANGUAGE: Fully taught in English

LEVEL OBTAINED: Master 2

HEAD OF THE MASTER PROGRAM: Dr. Christine CAGNON and Pr. Beatrice LAUGA

LOCATION: College of Sciences and Technology for Energy and Environment on the Pau campus (Pau, France)

The Master's degree in Molecular biology and Environmental Microbiology also offers an international outlook through both internships and the possibility of obtaining a double degree with the "Master in Biotechnology of Environment and Health" from the University of Oviedo (Spain).

Admission requirements



ENGLISH LANGUAGE REQUIREMENTS

Minimum required score: CECRL B2 level in English

ADMISSION REQUIREMENTS

Applicants must hold a first year of a Master's degree or Diploma equal to BAC+4 from a European university (minimum of 240 ECTS credits) in Biology or Science.

Contact

For any supplementary information or questions related to application, please contact:
christine.cagnon@univ-pau.fr - beatrice.lauga@univ-pau.fr

More information :
<https://formation.univ-pau.fr/m-csv-mbem>

International Welcome Desk :
<http://univ-pau.fr/en/welcome-desk>

Master's degree in Chemistry and Life sciences

Molecular Biology and Environmental Microbiology

Conception : Direction de la communication - Impression : Centre de reprographie - UPPA - Mars 2021



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Overview

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

The Molecular Biology and Environmental Microbiology Master's degree is at the heart of this technological and socio-economic 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-depollution (Total, Arkema, chemical industries at the Lacq site) and a 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 the 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, protein engineering) is one of the challenges for industrial and environmental policies in the coming years.

Prospects for employment

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 pollution.

An orientation towards research may be envisaged, depending on the choice of options and especially internships. It is based on the major research axes of the CME (Chemistry and Environmental Microbiology) cluster of IPREM (UMR CNRS 5254), recognised for its expertise in microbiology and the environment. The continuation of studies in doctoral thesis predisposes to jobs as teacher-researchers in higher education, researchers in public research organisations (CNRS, INRA) or industrial R&D departments.

Student Learning Outcomes

The theoretical, methodological and practical teaching must lead students to acquire the necessary bases for effective integration into the world of business or research, but also for communication with representatives of the socio-professional world.

The 2nd year of the Master includes:

- Theoretical and practical teaching by teacher-researchers, conferences with professionals from the sector and visits to companies,
- An internship of 4 to 6 months in a company, a professional organization or a research laboratory.

The courses are oriented towards the acquisition of scientific and technical skills as well as knowledge of professional concerns so that students can be operational to meet the demands of the sector but also be a source of innovative perspectives in the context of the missions they will be assigned.

During the first semester, the emphasis is placed on carrying out personal work, in groups of one to four depending on the course, covering bibliographical research, analysis of bibliographical articles and/or papers in the field of expertise, writing scientific papers, oral presentations, lab work including the development, implementation and analysis of the results of an experimental protocol.

Program objectives

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 tools,
- Search for pathogens in natural environments and industrial installations or select micro-organisms degrading 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,
- Master the tools of statistical analysis and integrating the knowledge necessary to respect the environment within the framework of sustainable development,
- Conduct field experiments to evaluate the effectiveness of chemical or biological methods for the protection of eco- and agrosystems.

SEMESTER 1

- **Langage** - English or French as a Foreign Language *2 ECTS - Mandatory*
- **Data analysis** - Statistical tools-project *4 ECTS - Mandatory*
- **Quality** - Quality assurance for analysis *2 ECTS - Optional*
- **Molecular biology and environmental microbiology**
 - Molecular biology technological applications *6 ECTS - Mandatory*
 - Microbial biotransformations and environmental applications *6 ECTS - Mandatory*
 - Molecular ecology *2 ECTS - Optional*
- **Environmental Chemistry**
 - Trace elements biogeochemical *2 ECTS - Optional*
 - Speciation concepts and analysis *2 ECTS - Optional*
 - Biological Macromolecules Characterization *2 ECTS - Optional*
 - Imaging techniques for environmental samples and materials characterization *2 ECTS - Optional*
- **Group project** - Environmental engineering project *4 ECTS - Optional*

SEMESTER 2

- **Internship** *20 ECTS - Mandatory*
- **Bibliography** - Bibliographic research *10 ECTS - Mandatory*