

# Master's degree in Chemistry and Life sciences

## Chemical and Microbiological Characterization for Environmental Issues



<http://formation.univ-pau.fr/m-csv-cmcei>

## Overview

Strongly increasing societal demand in the fields of Environment, Sustainable Development and Health, implies a synergy of advanced skills in Chemistry and Biology Sciences. In order to be able to effectively respond to this demand and to implement innovative solutions providing efficient answers to these requests, it is essential to perfectly understand the interaction of contaminants with living organisms and particularly their structures, properties, reactivities/activities in natural ecosystems. The “Chemical and Microbiological Characterization for Environmental Issues” (CMCEI) second year course of the Master in Chemistry and Life Sciences aims to train specialists with knowledge of the most recent advances in analytical chemistry, physico-chemistry, molecular biology and environmental microbiology.

The master is hosted at the College of Sciences and Technologies for Energy and Environment (STEE) of the Université de Pau et des Pays de l'Adour (UPPA) in France.

The STEE College has been founded within the framework of the prestigious French Initiative of Excellence label I-SITE (Initiatives Sciences, Innovation, Territories and Economy), obtained by our E2S-UPPA project.

## Student Learning Outcomes

At the end of this program, the students in the “Chemical and Microbiological Characterization for Environmental Issues” will be able to:

- Have an expertise in modern techniques in chemistry, molecular biology and microbiology
- Synthesize technical and research documentations to produce a technical study
- Plan and define a research or R&D project in analytical chemistry, molecular biology, microbiology or environmental survey
- Manage and carry out a project
- Manage field experiments to estimate the efficiency of chemical or biological methods for the protection of the ecosystems
- Interpret and validate results of chemical and biological analysis
- Produce summary report describing the experiments done, the applied methods used and the results obtained

## Prospects for employment or further study

### SECTORS:

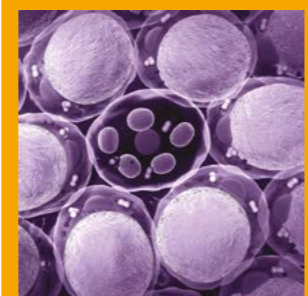
- Environment
- Agribusiness
- Analytical chemistry
- Chemical industries
- Biotechnology

### FIELDS:

- Research and Development
- Quality control

### POSITIONS:

- Academic positions
- Researchers (public institutes or private companies)
- Research and Innovation Engineers
- PhD students



## Program objectives

Entirely taught in English, the first semester is devoted to the knowledge of contaminants cycles and to the application of different techniques for the analysis of chemical elements and species of interest in various compartments of environment, the identification of microorganisms presenting a risk for environment or public health, but also quality assurance, critical evaluation of scientific publications and /or technical documentation.

The second semester consists of a 6 months research internship in the field of chemical and/or biological analysis applied to the environment in the Institute of Analytical Sciences and Physico-Chemistry for Environment and Materials (IPREM) Joint Research Unit teams.

The course gives a large place to learning by scenario projects, which enable the student to understand scientific approach of research as well as to put into practice various techniques and to deepen the reflection

### MASTER 2

#### SEMESTER 1

##### Trace elements in the environment

- Trace elements biogeochemical cycles 2 ECTS
- Speciation concepts and analysis 2 ECTS

##### Advanced analytical chemistry

- Advanced separation techniques 2 ECTS
- Advanced spectrometric techniques Coupling 2 ECTS
- Electrochemical sensors 2 ECTS
- Biological macromolecules characterization 2 ECTS
- Organic contaminants analysis 2 ECTS

##### Statistical tools, chemometrics and quality

- Analytical methods performances evaluation 2 ECTS
- Quality Assurance for Analysis 2 ECTS
- Statistical tools project 4 ECTS

##### Microbiology and molecular biology for Environmental applications

- Microbial biotransformations and environmental applications: project 4 ECTS
- Microbial biotransformations and environmental applications : conferences 2 ECTS
- Molecular biology, Technological applications 6 ECTS

##### Research tools and applications

- Scientific papers and documentation critical evaluation 2 ECTS
- Environmental Project 4 ECTS

##### Language

- French as a Foreign language 2 ECTS

#### SEMESTER 2

- Internship in academic or industrial research project 30 ECTS

# Detailed Program Facts

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

**APPLICATION DEADLINE :**  
Applications are opened from November to April

**HOW TO APPLY :** The application documents must be uploaded on the website : <https://aap-e2s.univ-pau.fr>

**PROGRAM INTENSITY:** Full-time

**DURATION:** 1 year

**CREDITS:** 60 ECTS

**LANGUAGE:** Fully taught in English

**LEVEL OBTAINED:** Master

**HEAD OF THE MASTER PROGRAM:**  
Dr. Christine CAGNON and  
Pr. Florence PANNIER

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

# Admission requirements

## ENGLISH LANGUAGE REQUIREMENTS

Minimum required score: CECRL B2 level in English

## FRENCH LANGUAGE REQUIREMENTS

None but French language courses are included in the formation

## ADMISSION REQUIREMENTS

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

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

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.

# Contact

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

[christine.cagnon@univ-pau.fr](mailto:christine.cagnon@univ-pau.fr) - [florence.pannier@univ-pau.fr](mailto:florence.pannier@univ-pau.fr)

**More information :**

<https://formation.univ-pau.fr/m-csv-cmcei>

**International Welcome Desk :**

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