

Contacts

Location

UNIVERSITÉ DE PAU
ET DES PAYS DE L'ADOUR

College of Sciences and Technology for Energy and Environment and IPREM Institute
Pau Campus - France

Coordinators

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More information

<https://formation.univ-pau.fr/m-mse-bim>

Admission Office

master.programs@univ-pau.fr

How to apply

The application documents must be uploaded on the website:

<https://ri.univ-pau.fr/m-programs>



Admission requirements

Academic requirements

- Applicants must hold at least a bachelor degree in chemistry, biology, physics for the Master 1 level.
- Applicants must hold at least a 4-year university level in chemistry, biology, physics for the Master 2 level

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

Detailed Program Facts

Stating in: Applications are open from September

Program intensity: Full-time

Duration: 2 years

Credits: 120 ECTS

Language: Fully taught in English

Level: Master's degree

Master's
degree
IN MATERIALS SCIENCE
AND ENGINEERING

Bio-Inspired
Materials

Overview

This master's degree aims at offering an educational background connecting the laboratory environment and the living world while responding to the ecological and sustainable transition challenges. Mimicking strategies elaborated by Nature represents infinite scientific and technological challenges. These challenges will be taken up through bioinspiration and biomimicry angles keeping in mind environmental awareness and ethics.

We offer our students a unique opportunity to explore and get inspired from living systems to develop novel materials. Our biomimetic approach focuses on cross-disciplinary courses that will make students reconsider how they elaborate syntheses, formulations and processing of tomorrow's materials as needed by the industrial partners to build our future society.

The primary objective is to train future young researchers with a special know-how in collaborative thinking and able to drive bio-inspired research projects.

Student Learning Outcomes

- Prepare students at an advanced specialized level to meet present and future challenges adopting the biomimicry philosophy
- Obtain basic and requisite knowledge in physics, chemistry and biology
- Awake curiosity and inspire respect for living systems
- Develop environmental awareness
- Develop collaborative and open working skills
- Adhere to the principles of the living world in their scientific approach
- Adopt a biomimetic approach with materials from concept to development
- Develop engineering research skills to engage in quality and successful research,
- Prepare students for leading positions in industry and government Research and Development departments.

Opportunities

Sectors

- Chemistry
- Energy
- Environment
- Aeronautics
- Building
- Cosmetics, healthcare & life science

Fields

- Research and Development

Positions

- Project Manager
- Senior manager in design and development
- Senior manager in production
- Senior manager responsible for quality operations or even production management
- Technical Director (R&D)
- Teacher-researcher

Program objectives

M1 - Semester 1

Mandatory courses

- Elaboration of materials 1
- Biochemistry
- Biomimicry
- Introduction to Polymer physics
- Materials analysis methods
- Biomimicry approaches
- French for foreigners or English as a Foreign language

Electives (10 ECTS)

- The different types of materials and their properties
- Environmentally sustainable chemistry
- Composite materials 1
- Project: active pedagogy
- Advanced part design

M1 - Semester 2

Mandatory courses

- Thermodynamics of macromolecular solution
- Global challenges ecological transition
- Materials chemistry in the lab
- Elaboration of materials 2
- Scientific communication
- Characterization methods
- Work and study internship
- Carbon footprint and life cycle analysis
- Project: Active pedagogy
- French for foreigners or English as a Foreign language

Electives (6 ECTS)

- Physical chemistry of macromolecular solutions
- Characterization methods
- Analytical Chemistry
- Biochemistry

M2 - Semester 3

Mandatory courses

- Materials for energy storage and conversion
- New materials
- Colloidal systems and surfactants
- Polymers and the Environment
- Introduction to biological soft matter
- Bio-inspired project
- French for foreigners or English as a Foreign language

Electives (8 ECTS)

- Biology: Plant biology and physiology
- Nanocomposites and nanomaterials
- Composites based on bioresources
- Adhesion & Adhesives

M2 - Semester 4

Internship

6-month internship in a private or academic laboratory

Trainings

Internship Mandatory (4-6 months)

• Master 1

A Minimum of 2 to 4 months of immersion in an academic or private research lab, in France or abroad.

• Master 2

Applied research project of at least a 6-month duration in an academic or private research lab.