



**CENTRALE  
LYON**

# International Master Biomimicry and Surface Engineering

Degree level: Master

Training time: 2 years

Language: English

Status: Student

Campus: Lyon-Ecully Campus

## Objectives



**The Biomimicry and Surface Engineering** master's degree trains scientists specializing in materials science and surface engineering through an innovative approach integrating biomimicry and ecological transition.

**This master's program aims to:**

- Train scientists specializing in materials science and surface engineering
- Promote a cross-disciplinary approach to biomimicry
- Integrate the ecological transition into materials design and manufacturing
- Develop skills in digital science applied to materials and surface engineering

## **Program**

### **Biomimicry and surface engineering: from the Lotus effect to climate change**

This program offers a cross-disciplinary approach, blending **biomimicry**, **ecological transition**, **surface fabrication and functionalization**, and **digital science**. Students benefit from solid theoretical training enriched by varied activities, such as **practical work** and projects in collaboration with the SURFAB technology platform.

## **Semester 1**

### **Scientific teaching units**

- Mathematics
- Computing science
- Biomimicry
- Materials and Mechanical Engineering
- Physical measurements
- Surface manufacturing (high-temperature processes)
- Biomimetic research project and project management

### **Cross-disciplinary teaching units**

Foreign language (including French)

## **Semester 2**

### **Scientific teaching units**

- Bio-inspired surface engineering

- Biology and living systems
- Polymers materials and eco-conception
- Optics and photonics for engineers
- Physics and chemistry of surfaces
- Research internship

## **Transversal teaching units**

- Foreign language (including French)
- Intercultural studies

## **Semester 3**

### **Scientific teaching units**

- Surface manufacturing: 3D additive manufacturing, femtosecond laser texturing
- Characterization of surfaces and nanostructures
- Numerical methods, from nanoscale to macroscale
- Climate change
- Advanced research project in biomimicry
- Tribology
- Living tribology

## **Semester 4**

6-month research internship in a laboratory or company.

## **Diploma and certification**

This course awards a national master's degree - controlled by the State.



## Career opportunities

The Master's degree in Materials Science and Engineering - Biomimicry and Surface Engineering - prepares students for further study towards a **doctorate** or for careers in R&D in various sectors such as **energy, transportation** (land, aeronautical, maritime), **medical** and **materials**.

Graduates can become interdisciplinary project managers, researchers, teachers. Areas of expertise covered include engineering, materials, surface science, surface treatments, surface engineering and biomaterials.

## Focus

This master's program is based on the Laboratoire de Tribologie et Dynamique des Systèmes, considered to be **the world's leading laboratory** for **engineering sciences**.

Students also have access to SURFAB's technical and scientific resources: **3D printing, treatment and texturing of surfaces** using ultra-short LASER processes...

## Admission requirements and application

### **Pre-requisites**

- Master 1: Licence or Bachelor's degree in a scientific subject related to the Master's topics. English level B2.
- Master 2: M1 passed in a subject related to the Master's topics. English level B2.

## **Application**

Applications are considered on the basis of a portfolio.

[Discover application procedures](#)

## **Tuition fees**

Knowing and anticipating your expenses is essential before making a serene commitment to training.

[Discover master's tuition fees](#) [Discover the average study budget at Centrale Lyon](#)

## **Administrative contact**

Education department - International Masters

Information and registration

[scolarite.master-lyon@listes.ec-lyon.fr](mailto:scolarite.master-lyon@listes.ec-lyon.fr)

## **Educational contact**

Valette Stéphane

Enseignant-Chercheur

[stephane.valette@ec-lyon.fr](mailto:stephane.valette@ec-lyon.fr)

## **Useful link**

- [Discover the training syllabus](#)