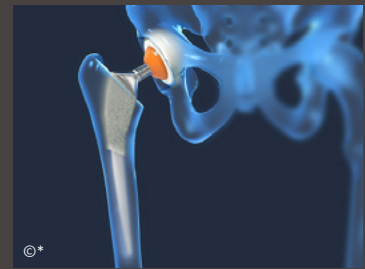


*One year Master's program in
chemistry and material sciences*

Materials and Sustainable Development

Training materials experts for industry and academic research



CREATE
MATERIALS
FOR THE
FUTURE



Université Claude Bernard



Lyon 1



ÉCOLE
CENTRALE LYON



Master Materials and Sustainable Development

About this Master's degree:

Sequence of courses and scientific knowledge:

«Materials and Sustainable Development » is a one year international master degree (60 ECTS) with a theoretical course (33 ECTS) composed of 6 compulsory teaching units (18 ECTS) relating to viscoelasticity of polymers, structural and chemical characterization (X rays and electrons), Conception and selection of materials and processes, Eco conception, as well as English and Project management, and 5 elective ones, to choose among 15 (15 ECTS) addressing polymers, glasses, metals, ceramics and composite materials for Health, Energy and Transport applications related to sustainable development. The courses are in English. The formation includes a 5 to 6-month long internship (27 ECTS) in an industrial or academic research laboratory.

Acquired skills:

in the field of organic materials (natural and synthetic origin), Inorganic materials: glasses, cements, ceramics, metals, composites and multi-materials.

Main goals:

- > DESIGN of Materials, formulations, processes;
- > MANUFACTURE according to specifications, procedures, safety and life cycle;
- > MONITOR performances, chemical compositions and compliance with regulations.



RESEARCH INTERNSHIP OPPORTUNITIES AVAILABLE IN THE MANY RESEARCH LABS AND COMPANIES IN AND AROUND LYON.



UNIVERSITÉ LYON 1 AND THE CITY OF LYON:

Lyon is one of the major centers for the chemical industry in France and in Europe. Université Lyon 1 is among the top French research universities, whose 86 research units produce over 4500 international articles and patents each year.

A year's study in the very heartland of the French chemical industry. This Master's program is geared to produce experts in the field of materials science for industry as well as for academic research.

<https://master-chimie-et-sciences-des-materiaux.univ-lyon1.fr>

The program:

■ One-year programs:

(this is the second year of the Master's program):
recruitment will be open to students who have completed at least a year of graduate studies abroad.

■ Fall Semester:

- > Scientific English
- > Project Management
- > Eco conception
- > Viscoelasticity of polymers
- > Structural and chemical characterization (X rays and electrons)
- > Conception and selection of materials and processes
- > Elaboration of materials : Advanced Macromolecular Engineering Strategies, Thermodynamics of complex Metal and Ceramics Systems, Composites

■ Spring Semester:

- > Research Internship

■ Provisional schedule:

- > Beginning of courses : September
- > End of courses : 4) February
- > Research internship : 5 to 6 months from 4) February

- > Material damaging: Tribology, Polymer and Composite Damaging, Metals and Ceramics Damaging
- > Advanced Materials 1: Materials for Diagnostics, Imaging and Therapy, Materials and Multimaterials for Energy, Sol-Gel coatings
- > Advanced Materials 2: Biomaterials, Functional Materials for Membranes and Coatings, Metals Recycling
- > Advanced Technologies: Functional Oxides, Assemblies and Microtechnology, Micro and Nanostructuring of polymers

Chemical Valley*: the heart of European chemical production and innovation within your reach at Lyon!

Situated just south of Lyon, Chemical Valley is known and recognized as the historical cradle of the French chemical industry since the 1850s. As a strategic area of the Lyon Metropolis, this valley concentrates a leading innovation and industrial production ecosystem around the chemical-energy-environment and cleantech sectors. By asserting its R&D and production vocation at national, European and global level, the Metropolis of Lyon has the ambition to "bring innovation to life" in the Valley in order to develop its economic attractiveness and improve the quality of life.

This collective dynamic brings together public and private partners to support the transformation of the industrial ecosystem by mobilising 3 levers :

- > the perpetuation of existing industrial activities
- > strengthening the productivity and competitiveness of companies
- > the reception of new complementary activities in the area.

The Chemical Valley employs 11,000 people and contributes to making Auvergne-Rhône-Alpes region the second most important economic region in France. Production and research in the fields of energy, petrochemical raw materials and refining, as well as research in these fields, took precedence over chemistry

■ **SOME FAMOUS CHEMICAL COMPANIES IN CHEMICAL VALLEY:** Arkema, Air liquide, Elkem Silicones, Institut Français du Pétrole Energies Nouvelles, Kem One, Solvay, Total Energies...

■ **AMONG THEM, OUR PARTNER COMPANIES:** Arkema, Kem One, Elkem Silicones, Solvay, Nexans, Saint Gobain, Michelin, Air Bus, Safran, ST Microelectronics, Schneider Electric...

GETTING TO KNOW LYON:

Lyon: considered as the France's second largest city (2.6 million inhabitants) and one of the best cities to live in as voted for by students from around the world.

The 9th most attractive European city for businesses,

- > **Lyon is the second largest job market in France** and one of the most innovative cities in the world.
- > **Many headquarters of international organizations** like Interpol, the World Health Organization or the International Agency for Research on Cancer are based in Lyon.



+ First French city for culture after Paris

A real city of arts, Lyon links its cultural heritage to the present.

- > **Gastronomy:** 4000 restaurants. Chef Paul Bocuse
- > **Cinema:** Auguste and Louis Lumière, the world's first filmmakers
- > **Festival of Lights:** millions of visitors each year
- > **A wide range of cultural venues** including the Opera House, the museum of Gallo-Roman civilization, the Auditorium, the Dance Theater, and some 20 other theaters!
- > In terms of **architecture**, Lyon has been classified as a UNESCO world heritage site and the city hasn't stopped revisiting and requalifying it. The metamorphosis of the modern Confluence districts is an example among others.

+ An eco-friendly and easy-to-reach city

- > **Eco-friendly modes of transport** like the Vélo'V city bicycle system
- > **Lyon-Saint Exupéry international airport and TGV high-speed train** (less than 2 hours from Paris or other cities).

MASTER MATERIALS AND SUSTAINABLE DEVELOPMENT

Pr. Emmanuel Beyou
emmanuel.beyou@univ-lyon1.fr

Dr. Nathalie Sintès
nathalie.sintes@univ-lyon1.fr

<https://master-chimie-et-sciences-des-materiaux.univ-lyon1.fr>

 www.facebook.com/UnivLyon1

 www.youtube.com/UnivLyon1

 <https://twitter.com/UnivLyon1>

<https://master-chimie-et-sciences-des-materiaux.univ-lyon1.fr>