SCIENCE, TECHNOLOGY, HEALTH

Master's degree Chemistry of Materials for Energy and Environment (CM2E)

Master Materials Science and Engineering

ECTS
120 credits

Duration
2 years

Component
Collège Sciences et Technologies pour l'Energie et l'Environnement (STEE)

Language(s)
English

VAT (%)
20.0

Presentation

Check our FAQ HERE

Master of Science (MSc) **CM2E** "Chemistry of Materials for Energy and Environment" provides a complete education program in the field of materials, by addressing all aspects related to their synthesis/elaboration, their fine characterization, and their implementation for specific applications.

The training delivered by Master CM2E allows you to find rapidly a job in the industry as a senior executive, in all sectors of activity using or designing materials, as soon as you have obtained the Master's degree. Alternatively, you can continue your training with a Ph.D. thesis (three years), which is an advantage in several fields of research and development.

Master CM2E relies on recognized senior researchers, professors, and assistant professors, in the field of chemistry and physics, carrying out their research activity at IPREM Institute (Institute of Analytical Sciences and Physico-Chemistry for Environment and Materials) https://iprem.univ-pau.fr/en/institute.html, more precisely in the following scientific departments (clusters): PCM " Physico-chemistry of surfaces and polymer materials" and CAPT " Analytical, Physical and Theoretical Chemistry". The teaching program, comprising lectures, supervised and practical work, and case studies, is taught by university lecturers and researchers, and by personnel from the socio-professional sector. Internships can be performed in companies or in academic research laboratories (in this case they are generally done in IPREM, but internships can also be done in other labs in France or abroad).

The MSc degree meets the industrial requirements in terms of skills and know-how in the field of materials and integrates a reflection on sustainable development and implementation of new materials able to meet the new requirements and challenges in terms of energy management and respect for the environment.

Objectives

- Train the students to an advanced specialized level for present and future challenges in materials chemistry, energy, polymers, and modeling
- Develop their engineering and research skills

- Prepare students for leading positions in industry and public institutions.

Your university

Skills

At the end of this program, the students of the "**Chemistry of Materials for Energy and Environment**" master's degree will be able to:

- Elaborate materials (organic and inorganic),
- Use various analytical techniques to characterize materials,
- Validate, interpret, and model experimental results,
- Produce quality research,
- Carry out a research project.
- Summarize their work (experimental plan, results, and interpretation) in a report and communicate appropriately with experts.

Additional information

Scholarships

- EIFFEL Scholarship of Excellence
- Talents' Academy Grants
- Catalogue des Bourses Campus France

The International Master Programs Admission Office

master.programs@univ-pau.fr

Organisation

Organization

Training content

Practical training is carried out in the chemistry lab of the university, and in the different research rooms of the Institute of Analytical Sciences and Physico-Chemistry for Environment and Materials (IPREM), hosting cutting-edge scientific equipment.

Trainings

Intership : Mandatory

Intership duration : 2-3 months for the 1st year / 4-6 months for the 2nd year

Admission

Admission requirements

Academic Requirements

- Applicants must hold at least a Bachelor's degree for the Master 1 level.
- Applicants must hold at least a 4-year university level 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

How to apply

Apply here from October to March

Tuition Fees and partial exemptions

Go to the Tuition fee page

> ***The school partially exempts non-EU students from the differentiated fees for initial training enrolling in the Master's program.***

Student capacity

30 students: 15 in M1 and 15 in M2

Prerequisites

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And after

Professional insertion

Prospects for employment or further study

Sectors

- Chemistry
- Energy (photovoltaics, batteries, fuel cells, artificial photosynthesis ..)
- Environment (non-polluting materials, pollution control materials, and storage…)
- Transport (composite materials, surface treatments ...)...
- Building (thermal and sound insulating coatings ...)
- Cosmetics & life science

Fields

- Research and Development

Positions

- Research and Innovation Engineer, Ph.D. students
- Project Manager
- A senior manager in design and development (design engineer)
- A senior manager in production (process engineer, production engineer)
- A senior manager responsible for quality operations or even production management
- Technical Director (R & D)
- Teacher-researcher (possible at the end of a doctorate.)

Useful info

Contacts

Head of Teaching

Didier BEGUE

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Head of Teaching

Rémi DEDRYVERE

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Administration contact

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Continuing education and work-study

DFTLV

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accueil.forco@univ-pau.fr

Disability

Mission Handicap

+33 5 59 40 79 00

handi@univ-pau.fr

Partner laboratories

IPREM

https://iprem.univ-pau.fr

Place

Pau

Campus

Pau

Program

1st semester

	Nature	CM	TD	TP	Crédits
Different kinds of materials and their properties	Teaching Unit				2 credits
Elaboration of materials 1	Teaching Unit				4 credits
Organic polymers	CE				2 credits
Inorganic materials	CE				2 credits
Environmentally sustainable chemistry	Teaching Unit				3 credits
Environmentally friendly design of materials	CE				2 credits
Green chemistry	CE				2 credits
Polymer science in the lab	Teaching Unit				2 credits
Biomimetism	Teaching Unit				4 credits
Modeling	Teaching Unit				4 credits
Language to choose	Choice				2 credits
English	Teaching Unit				2 credits
French for foreigner semestre impair	Teaching Unit				2 credits
Magnetic properties of materials	Teaching Unit				2 credits
Characterization methods 1	Teaching Unit				2 credits
X-ray diffraction	CE				2 credits
Structural analysis, scattering techniques	CE				2 credits
Coupling experience and theory	Teaching Unit				2 credits
Biomimetic peptide self-assembly for functional materials	Teaching Unit				2 credits
Cell Biology	Teaching Unit				2 credits

Biomimetism introduction and awarness	Teaching Unit	4 credits
Corporate world	Teaching Unit	2 credits
Projects managment and intellectual property	CE	2 credits
Composite materials 1	Teaching Unit	2 credits
Introduction to composite materials	CE	1 credits
Mechanical properties of composite materials 1	CE	1 credits
Intro to polymer physics	Teaching Unit	2 credits
Main polymer families and recycling	CE	2 credits
Electrochemical kinetics	Teaching Unit	2 credits
Computer programming (visio)	Teaching Unit	
Statistical thermodynamics (visio)	Teaching Unit	

2nd semester

	Nature	CM	TD	TP	Crédits
Physical chemistry of macromolecular solutions	Teaching Unit				2 credits
Academic and industrial internship	Teaching Unit				5 credits
Project	CE				1 credits
Industrial or academic internship	CE				3 credits
Materials chemistry in the lab	Teaching Unit				2 credits
Characterization methods 2	Teaching Unit				6 credits
Nuclear magnetic resonance (NMR)	CE				2 credits
Microscopies	CE				2 credits
Elaboration of materials 2	Teaching Unit				4 credits
Polymer chemistry	CE				2 credits
Sol-gel chemistry	CE				2 credits
Language to choose	Teaching Unit				2 credits

English	Teaching Unit	2 credits
French for foreigner semestre pair	Teaching Unit	2 credits
Electronic properties of materials	Teaching Unit	4 credits
Li-ion battery project	Teaching Unit	2 credits
Global Climate change (Climate Economics, Risk, Anthropocene)	Teaching Unit	2 credits
Project Biomim'expo	Teaching Unit	2 credits
Material corrosion	Teaching Unit	2 credits
Electronic and vibrational spectroscopies	CE	2 credits
Remarkable properties materials	Teaching Unit	2 credits
Theoretical spectroscopy	Teaching Unit	2 credits
Inorganic materials	Teaching Unit	4 credits
Metals and alloys	CE	2 credits
Ceramics	CE	2 credits
Composite materials 2	Teaching Unit	1 credits
Thermoset matrices	CE	1 credits

3rd semester

	Nature	CM	TD	TP	Crédits
Materials For Energy Storage And Conversion	Teaching Unit				4 credits
New materials	Teaching Unit				4 credits
Surface Chemistry And Int	Teaching Unit				4 credits
Multi-Scale Description of Complex systems	Teaching Unit				4 credits

Optical Properties Of Materials	Teaching Unit	4 credits
Language to choose	Teaching Unit	2 credits
English	Teaching Unit	2 credits
French for foreigner	Teaching Unit	2 credits
Methods And Techniques For Polymer-based Materials Synthesis	Teaching Unit	2 credits
Methods And Techniques For Polymer-based Materials Synthesis	CE	2 credits
Nanomaterials : from the laboratory to the application	Teaching Unit	1 credits
Polymers and the environment	Teaching Unit	2 credits
Natural Polymers - Biomass Valorization	CE	2 credits
Adhesion & Adhesives	Teaching Unit	4 credits
Theoretical Chemistry and Spectroscopies (RCTF)	Teaching Unit	4 credits
Theoretical chemistry applied to the study of materials (RCT)	Teaching Unit	4 credits
Polymers for living systems	Teaching Unit	2 credits
Introduction to biological soft matter	CE	2 credits
Imaging techniques for environmental samples and materials	Teaching Unit	2 credits
Industrial copolymers	Teaching Unit	1 credits
Industrial copolymers	CE	1 credits
Nanocomposites	Teaching Unit	1,5 credits
Nanocomposites	CE	1,5 credits
Nanomaterials	Teaching Unit	1,5 credits
Nanomaterials	CE	1,5 credits
Numerical methods	Teaching Unit	3 credits

Quantum reactivity	Teaching Unit	3 credits

4th semestre

	Nature	CM	TD	TP	Crédits
6 weeks - Introduction to laboratory research	Teaching Unit				6 credits
4 months - Internship in research in the fields of pol	Teaching Unit				24 credits
Professional itinerary 6 months Internship in industry	Teaching Unit				30 credits