MASTER MATERIALS SCIENCE AND ENGINEERING

IN BRIEF
Type of diploma: Master degree
Ministry field: Science and Technology
Mention: Sciences et Génie des Matériaux (SGM)

TRAINING CONTENT
The Materials Science and Engineering Master is a general training aiming at giving proper scientific knowledge to students wishing to work in the Materials industry or research. Each course addresses the specific requirements of the socio-economic backgrounds with the support of research activities.

The Materials Science and Engineering Master offers three courses:

- M2 Materials Science and Engineering: Chemistry and Physico-chemistry of Materials

ORGANIZATION

ORGANIZATIONAL UNIT

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

PLACES

Pau, Tarbes
The selection and appropriate use of a material requires chemical expertise that draws on knowledge of the material preparation and characterization sectors, and training in interpretation and modeling of the structural and functional properties of materials. Designed specifically for students taking courses in which chemistry is the predominant subject, the CPCM (Chemistry and Physical Chemistry of Materials) curriculum offers training courses in each of these different sectors. The content of the teaching program is the result of a general synthesis concerning sustainable development and the use of innovative materials that provide a potential response to new requirements and challenges related to energy and the environment.

The teaching program, comprising lectures, supervised and practical work and case studies, is taught by university lecturers and researchers, but also by personnel from the socio-professional sector. The practical work and case studies are done in the laboratories of the Multidisciplinary Research Institute for the Environment and Materials (IPREM CNRS UMR 5254), using high-performance and top-level apparatus. The program also includes modules that prepare students for entering the world of work, use of English in courses and for writing scientific papers, and internships in companies and academic research laboratories.

**OBJECTIVES**

* Prepare students at an advanced specialized level to meet present and future challenges in specialty areas in chemistry, polymers, inorganic chemistry and modeling
* Develop engineering research skills to engage in quality and successful research,
* Prepare students for leading positions in industry and
government Research and Development departments.

### SKILLS

At the end of this program, the students in the «Materials
Science and Engineering: Chemistry and Physico-
Chemistry of Materials master’s degree” will be able to:

* Prepare materials and samples,
* Use surface and volume analytical techniques to achieve
  a sound command of materials characterization,
* Validate, interpret and model experimental results,
* Write a synthesis report and communicate appropriately
  with experts,
* Produce quality research,
* Carry out a research project.

### ADDITIONAL INFORMATION

### TRAINING CONTENT

Teaching, consisting of lectures, tutorials, practical work and
projects, is taught by both university research professors and
by professionals from the socio-professional world.

Projects and practical works are carried out in the laboratories
of the Multidisciplinary Research Institute for the Environment
and Materials (IPREM) on high performance equipment. The
program also includes preparation modules for professional
integration, the practice of scientific English as well as
internships in companies as well as in academic research
laboratories.

Additionally, the CPCM course offers course units delivered in
collaboration with the Universities of Toulouse, Montpellier and
Bordeaux as part of the French Theoretical Chemistry Network
(RCTF).

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<td>Materials: nano materials, bio materials and hybrid materials</td>
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<td>Surface chemistry and interfaces</td>
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<td>Modelisation of materials with specific properties</td>
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<td>Optical properties of materials</td>
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<td>Methods and techniques for polymer-based materials synthesis</td>
<td>4</td>
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<td>Natural polymers – biomass valorization (optional)</td>
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<td>Project management – industrial property and patents (optional)</td>
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<td>Formulation of adhesives (optional)</td>
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<td>Theoretical chemistry applied to the study of materials (optional)</td>
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<td>Internship in research in the fields of polymer chemistry, inorganic chemistry, materials,</td>
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Semestre 3

- **UE Obligatoires (Mandatory)**
  - Materials For Energy Storage And Conversion
  - Nouveaux matériaux
  - Physico chimie des surfaces et des interfaces
  - Modélisation des matériaux à propriétés spécifiques
  - Propriétés optiques des matériaux
  - Anglais spécifique de communication
- **UE Optionnelles (Optional)**
  - Procédés et techniques d'élaboration des matériaux à base de polymères
  - Polymères naturels et valorisation de la biomasse
  - Adhésion et adhésifs
  - Chimie théoriques et spectroscopies
  - Chimie théorique appliquée à l'étude des matériaux
  - Composites à base de nanomatériaux
  - Composites et nanomatériaux : Nanomatériaux
  - Réalités industrielles

Semestre 4

- **UE Obligatoires (Mandatory)**
  - Iniation à la recherche en laboratoire: parcours recherche
  - Stage en laboratoire: parcours recherche
  - Stage en industrie: parcours pro

**ACCESS CONDITIONS**

*Applications are open from December to April from* [http://aap.e2s-uppa.eu](http://aap.e2s-uppa.eu)

**ADMISSION REQUIREMENTS**
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

Tuition Fees

European students (from a UE country, the Economic European Area or Switzerland)

Enrolment cost: Usual amount for a Master's degree in France

Non-European students

If you were already registered in a public institution for the academic year 2018/19, and you want to continue with the same university course, tuition fees don’t change. The French State continues to cover most of your cost of training.

If you arrive in France for the academic year 2019 with a VLS-TS visa for studies or if you were already registered in a public institution in 2018/2019, and you are changing course (starting a Master’s course after a Licence course, or starting a Doctorate/PhD after a Master’s course), the French State will cover 2/3 of your cost of training. Tuition fees will be:

3,770 euros for a full year in Master’s course.

* Region Aquitaine Scholarships for non-EU students
* E2S Talent's Academy Scholarships for all students
* Master's scholarships

Professional Insertion

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

**Fields:**

* Research and Development

**Positions:**

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

**ORGANIZATIONAL UNIT**

Collège Sciences et Technologies pour l’Energie et l’Environnement (STEE)

**PLACES**

Pau

**PERSON IN CHARGE**

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