

## Chemistry

In 1762, the Académie Française defined chemistry as “the art of breaking down substances, analyzing them, and recombining them.” Today, chemistry plays a part in every field in which matter is subjected to change: pharmaceuticals, cosmetics, agriculture, materials, metallurgy, electronics, aeronautics, etc.

In fact, chemists are so omnipresent in these sectors, working alongside practitioners of other disciplines, that they have become vital components of them. Chemistry’s applications include fertilizers, plastics, paints, beauty products, adhesives, medications, scents and flavors, and phytosanitary products. New preoccupations of today’s chemists concern product safety and environmental protection.

Among the recipients of the great prizes and honors for chemistry research (Davy Medal, Nobel Prize in Chemistry, Hudson Prize, or Leverhulme Medal), one finds many French chemists, including eight Nobel Prizes, from Marie Curie to Yves Chauvin in 2005.

With chemistry being so embedded in so many economic sectors, French universities and engineering schools offer a wide array of chemistry degrees. A high level of specialization is available at the master level with training available in research and development in the fields of organic chemistry, mineral chemistry, specialty chemicals (paints, varnishes, explosives, essential oils, phytopharmaceuticals, etc.), as well as the soap, perfume, and personal hygiene industry.

### Chemistry by the numbers

- 2<sup>nd</sup> largest chemical industry in Europe.
- 7<sup>th</sup> largest chemical industry in the world
- € 82.4 in revenue (2014).

Source: Union des Industries Chimiques, [www.uic.fr](http://www.uic.fr)

### INTERNATIONAL

The ever-growing internationalization of scientific research is increasing collaborations between researchers and research institutions from all continents. The institute of chemistry at the CNRS promotes a policy of active international relations and itself participates in many exchange programs (bilateral workshops, CERC3, etc.). This institute also maintains many international exchange networks such as PICS (international programs for scientific cooperation), LIA (associated international laboratories), GDRI (international research groups), and UMI (international mixed research units).

A number of uniquely French sectors of excellence find expression through chemistry. Underpinning the restaurant field is research in so-called molecular gastronomy. Developed by Hervé This and a team at the chemistry laboratory at AgroParisTech-INRA in Paris, this new method of studying the phenomena that occur during cooking and other culinary processes has inspired many chefs – Ferran Adrià (Catalonia), Heston Blumenthal (England), Pierre Gagnaire, Thomas Keller (United States), and Thierry Marx – while spreading the new “molecular cuisine” of French origin.

### Related fields

Agronomy, Agri-Food, Agriculture, Viti-Viniculture — Biology — Biochemistry — Biotechnology — Environment — Manufacturing — Engineering — Nanoscience — Pharmacology — Physics — Health

### Subfields

Analytic chemistry - Chemistry of materials and surfaces (biomaterials) - Inorganic chemistry - Mineral chemistry - Nuclear chemistry - Organic chemistry - Physical chemistry - Plant chemistry - Quantum chemistry - Theoretical chemistry - Computational chemistry - Electrochemistry - Biological and biomedical engineering - Water engineering - Industrial engineering - Process engineering - Geology and geoscience - Nanotechnology - Petrochemistry - Thermochemistry

### Useful links

- Centre National de la Recherche Scientifique (CNRS): <http://www.cnrs.fr>
- Les entreprises du médicament: <http://www.leem.org>
- Fédération des Écoles de chimie et de génie chimique (Fédération Gay Lussac): [www.19ecolesdechimie.com](http://www.19ecolesdechimie.com)
- Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER): <http://www.ifremer.fr>
- Institut National de la Recherche Agronomique (INRA): <http://www.inra.fr>
- Institut National de la Santé et de la Recherche Médicale (INSERM): <http://biblioinsERM.inist.fr>
- European Regulation on Registration, Evaluation, Authorization, and Restriction of Chemicals (June 2007): [http://ec.europa.eu/enterprise/reach/index\\_fr.htm](http://ec.europa.eu/enterprise/reach/index_fr.htm)
- Société Française de Chimie (SFC): <http://www.sfc.fr>
- Information portal on chemistry, pharmaceuticals, and parapharmaceuticals: <http://www.france-chimie.com>
- Union des Industries Chimiques: <http://www.uic.fr>

### CHOOSE YOUR PROGRAM

- Campus France program catalogue: [www.campusfrance.org](http://www.campusfrance.org)>Trouvez votre formation
- Programs taught in English: [www.campusfrance.org](http://www.campusfrance.org)>Programs Taught in English
- CampusBourses, financing your studies in France: <http://www.campusfrance.org>>Financez vos études

## Licence level

### **Brevet de Technicien Supérieur (BTS)** (Secondary diploma +2 years of higher education) – L2

#### • Chemical professions

The BTS in chemistry is offered by four high schools (Angers, Nice, Marseille, and Paris). It trains students for jobs in production, quality control, R&D, product application, and substance design and analysis.

#### • Industrial control and automation (CIRA)

The CIRA BTS is offered in 40 French cities. It trains students for jobs in the area of studies, quality control, and trials in chemical, petrochemical, metallurgical, or agri-food facilities.

### **Diplôme Universitaire de Technologie (DUT)** (Secondary diploma + 3 years of higher education) – L2

The DUT in **chemistry** has three concentrations:

- industrial chemistry (4 schools),
- materials chemistry (4 schools),
- analytical chemistry and synthesis (18 schools).

The DUT in **chemical process engineering** has two concentrations:

- bio-processes (pharmacy, environment, agri-food) in 8 schools,
- processes (chemical and paracheical industry) in 6 schools.

### **Professional licence** (Secondary diploma + 3 years of higher education) – L3

5 professional *licences* in **chemical and pharmaceutical industries** are available in the broad field of **science, technology, and health**. Numerous specializations are available (analytical chemistry, quality control, etc.) for different sectors (industry, cosmetics, environment, etc.).

### **Licence** (Secondary diploma + 3 years of higher education) – L3

The general *licence* in **chemistry** in the broad field of **science and technology** is offered by 30 universities with three concentrations:

- **Chemistry**,
- **Physics and chemistry**,
- **Chemistry, food, health, and the environment**.

• [www.campusfrance.org](http://www.campusfrance.org)>Trouvez votre formation>Licence

## Master level

### **Master** (Secondary diploma +5 years of higher education) – M2

Master's degrees in **chemistry** are offered in the broad field of **science, technology, and health** with some 20 specializations in fundamental and applied chemistry (medicine, engineering, environment, biology, nanoscience, energy, physics, etc.) and roughly 20 more in other areas of chemistry (materials, processes, analysis and quality control, chemical pollutants, synthesis, plastics, surfaces, water treatment, etc.).

A master in **biochemistry** is also available in the broad field of biotechnology.

• [www.campusfrance.org](http://www.campusfrance.org)>Trouvez votre formation>Master

The **École Nationale Supérieure du Pétrole et des Moteurs** offers a master's degree in petrochemicals. Two specializations are offered:

- fluid mechanics and process engineering with a focus on **oil, gas, and motor technologies** (for international students),
- industrial systems engineering with a focus on **catalysis and processes**.

• [www.ifp-school.com](http://www.ifp-school.com)

More than 20 master's programs are taught in English (19 of which confer national degrees): molecular chemistry (catalysis, engineering), atmospheric environment, energy, green chemistry, etc.

• [www.campusfrance.org](http://www.campusfrance.org)>Trouvez votre formation>Catalogues>Programs Taught in English

### **Diplôme d'ingénieur / Titre d'ingénieur - (professional qualification, master equivalent)** (Secondary diploma +5 years of higher education) – M2

The following French engineering schools confer master's degrees recognized by the CTI (French commission on engineering degrees):

- Écoles Nationales Supérieures de Chimie (in Clermont-Ferrand, Lille, Montpellier, Mulhouse, Rennes, Paris)
- Écoles Supérieures de Chimie Organique et Minérale (Compiègne), Arts Chimiques et Technologiques (Toulouse), Chimie Physique et Électronique (Lyon), Chimie Industrielle (Paris), Chimie et Procédés (Rouen),
- Institut Polytechnique pour la Spécialisation en Chimie-Physique et Matériaux, Industries Agroalimentaires, Structures Composites in Bordeaux.

• [www.cti-commission.fr](http://www.cti-commission.fr) >Cherchez un programme d'ingénieur habilité

## Beyond the master level

### **Mastère Spécialisé (MS, specialized master)** (Master +1 year of higher education)

Programs with the "specialized master" label are accredited by the *Conférence des Grandes Écoles*. The following specialized master programs are available:

- process engineering and biotechnology at the École Supérieure de Chimie, Physique, Électronique de Lyon [www.cpe.fr](http://www.cpe.fr)
- risk management and threats at the École Nationale Supérieure de Chimie de Mulhouse at the Université de Haute Alsace Mulhouse [www.enscmu.uha.fr](http://www.enscmu.uha.fr)
- safety and international regulations in the perfume and cosmetics industry at the École Supérieure de Chimie Organique et Minérale (Compiègne) [www.escom.fr](http://www.escom.fr)

• Information on MS programs:  
[www.campusfrance.org/fr/ressource/les-masteres-specialises-ms](http://www.campusfrance.org/fr/ressource/les-masteres-specialises-ms)