# MASTER'S DEGREE IN CHEMISTRY

## UNIVERSITÉ PSL

*The master's degree in Chemistry is a co-accredited training between PSL and Sorbonne University. Rich and modular, it presents chemistry in a general and thorough way, both transversal and open to all of its interfaces, notably with physics and biology. This master's degree is anchored in the most contemporary research in chemistry and committed to undertake the current challenges of our societies. It trains high level scientists who, at the end of their master's degree, can be part of a wide variety of professional backgrounds, from entering the job market to the preparation of a PhD. Part of PSL graduate program "Chemistry", the master is composed of a variety of tracks with a la carte options allowing each student to personalize her/his training. We highlight here two specific tracks illustrating this diversity: Chemistry & innovation and Chemistry & Life Sciences.*

### OBJECTIVES

— **The Chemistry & Innovation track** aims at providing students with a broad background in chemistry and with abilities to transform scientific knowledge into innovative research or economic outputs.The track offers high level courses in all fields of chemistry (molecular chemistry and chemical biology, physical and analytical chemistry, theory and modelling, materials chemistry) oriented towards the most innovative and up-to-date research topics. A choice of elective courses allows students to cutomize their own curriculum. Students are encouraged to develop their innovative skills through human and transverse skills, transdiciplinary activities, projects in interaction with research labs in PSL and internships.

— **The Chemistry & Life Sciences track** aims at training highly motivated students interested in interrogating quantitatively and comprehensively biological systems at the molecular, cellular and network levels using various experimental and theoretical approaches. It proposes high quality core courses in chemistry and biology, and a broad range of specialized courses covering various topics at the chemistry/biology interface. The track allows students to develop their creativity through various research projects and internships, and to learn the latest discoveries and innovations at the chemical frontiers of living matter through privileged interactions with faculty members.

### MAIN ASSETS

— **A broad training in fundamental chemistry.**
— **Training by research** through strong interactions with research laboratories and various formats ranging from research challenges to laboratory internships.
— **Modularity** which makes it possible to build personalized specialization profiles.
— **Multiple skills and innovation**: a unique course offer to open minds from deep training in innovation to various soft skills.

### CAREER OPPORTUNITIES

Academic research (PhD, postdocs), private sector research, development and production, medical research, innovation an

***English track***



PSL UNIVERSITÉ PARIS

## ORGANIZATION OF THE MASTER'S DEGREE

### Year 1 (60 ECTS)

**3 tracks proposed:**

— Chemistry and Innovation
— Chemistry and Life Sciences (1)
— Chemistry
  • Chemistry ENS – PSL
  • Chemistry Sorbonne Université

### Year 2 (60 ECTS)

**6 tracks proposed:**

— Chemistry and Life Sciences (2)
— Analytical, Physical and Theoretical Chemistry
— Molecular Chemistry
— Chemistry of Materials
— Chemical Engineering
— Agregation (very competitive track leading to a diploma to become a high school teacher)

**Location: Classes will be held in Paris on the campuses of the institutions involved in the program**

## COURSES

The offer of courses is broad and organized in a highly modular fashion within and betwen tracks.
We showcase here the contents of only 2 tracks:

### — Chemistry & Innovation track

• **Molecular design and synthesic tools:** Organic and organometallic chemistry, bio- and bioinorganic chemistry, advanced spectroscopies, chemical tools for biology and health sciences, medicinal chemistry, molecular biotechnology.
• **Analytical and physical chemistry:** Environmental chemistry, separation sciences, physico-chemistry and interfaces, spectroscopies and imaging, analytical chemistry for biotechnology and diagnostics, interfaces of biomaterials.
• **Theoretical chemistry and modelling:** Electronic structure theory and statistical mechanics, from electronic structure to chemical properties and reactivity, molecular simulation in chemistry.
• **Smart materials chemistry:** Concepts from inorganic materials to soft matter: design, synthesis and properties, materials for energy or optical applications, advanced materials: research and applications.

### — Chemistry & Life Sciences 1 & 2 tracks

• **Fundamentals in chemistry and biology:** Organic chemistry, biophysical chemistry, bioinorganic chemistry, biochemistry, sustainability, biointerfaces, catalysis & green chemistry, biological chemistry, colloid chemistry, biophysics, chemometrics, biocatalysis, statistics, molecular biology & genetics, cell biology, genetics, morphogenesis, microbiology, epigenetics, oncology.
• **Chemical and biological engineering for biotechnology and sustainable chemistry:** Synthetic biology, system biology, chemical biology, applied microbiology, medicinal chemistry & biotechnology, biomaterial science, tissue engineering, hybrid materials.
• **Modeling approaches and analytical tools for the study of biological systems:** Machine learning, big data, medical imaging, bio-analytics, microfluidics, analytical physical chemistry, multiscale theory and computational methods for biomolecule simulations, principles and applications of fluorescence microscopy.

## ADMISSIONS

**Prerequisites (M1):** bachelor degree or equivalent in chemistry or any science at its interface. C1 level in English recommended.
**Admission process:** online application through PSL portal and interview.

## DIPLOMA DELIVERED

Master's level diploma from Université PSL.

**More information**
psl.eu/en/education/masters-degree-chemistry

**Contact**
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DIPLÔME NATIONAL DE MASTER CONTRÔLÉ PAR L'ÉTAT

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