

MASTER

Physical- Chemistry and Chemical-Physics (PCCP)

Program factsheet

ACADEMIC COOPERATION

Consortium of 5 universities:

- › France: University of Bordeaux (UBx)
- › Belgium: Université de Namur
- › The Netherlands: Universiteit Leiden
- › Spain: Universidad del País Vasco
- › USA: Colorado School of Mines (CSM)

LEVEL

- › Master of Science in Chemistry (specialization in Physical-Chemistry and Chemical-Physics)
- › Dual Master agreement with CSM

LANGUAGE REQUIREMENTS

A good level of English is required: level B2

- › M1: 70% of lectures and all tutorials are taught in English
- › M2: all classes are taught in English

ADMISSION REQUIREMENTS

Candidates must fulfill the following:

Hold a Bachelor degree of Science in Physical-Chemistry, Chemistry, Physics or an equivalent degree.

PROGRAM DURATION

2 years (120 ECTS).

FEES AND SCHOLARSHIPS

- › University registration fees (scholarship students exempted): 200 to 400€. For dual Master degrees, specific fees are applied.

Scholarships are available for the mobility period:

- › International Masters grants: for Bordeaux students, covering 5 to 9 months
- › Aquimob grants: www.aquimob.fr
- › Eiffel grants: for international students, covering a full year in Bordeaux
- › Mobility grants from UBx or host institutions
- › Erasmus program scholarships

Strengths

- › High-level educational and research environment, proposed by the partner institutions
- › Master students acquire project management skills at an international level
- › Mobility during the second year offers access to a wide range of courses and training
- › Dual Master degree opportunity with the Colorado School of Mines
- › International mobility facilitates integration within both academic and industrial domains
- › Supported by the International Masters program within the Bordeaux "Initiative of Excellence"

Program outline

The PCCP program aims to integrate Master students within academic and industrial fields of fundamental physical chemistry. Various aspects are concerned: study of matter and its transformations, analysis and control of physical and chemical processes, light-matter interactions and spectroscopy techniques, modelling of physical and chemical processes from molecular to macroscopic scale.

Applications cover scientific fields ranging from nanotechnologies, photonics, optoelectronics and organic electronics, to environmental sensors and detection systems.

The PCCP Master is supported by high-level educational and research partners, represented by the consortium of universities engaged in the program. Students follow their courses within a challenging, international environment.

Annual summer schools, organized by the consortium partners, complete the students' training by offering a focus on several topics relative to PCCP.

The first year of the Master degree is focused on the fundamental aspects of Physical Chemistry (thermodynamics, quantum chemistry, spectroscopy and numerical tools). The second year is dedicated to specialized topics (advanced spectroscopy and imaging, photonics, computational chemistry, environmental sciences).

Master students choosing to follow the specific dual Master agreement with CSM will spend their first year at the partner university. Upon completion of this specific program, graduates will obtain a dual Master degree.

International aspects of the program are introduced progressively during the first year, with most courses taught in English. A full time 2-month research project is also organized in the context of international scientific project management.

The second year is fully taught in English and international mobility is mandatory (at least during the second semester for the Master thesis work), thus strengthening the international dimension of the degree. Numerous mutualized lectures are carried out featuring high-level, local research activity. Practical aspects are emphasized to favor the future integration of the student within the working world.

Year 1:

Courses are in French, except when international students are attending

- › Numerical methods (6 ECTS)
- › Thermodynamics (6 ECTS)
- › Quantum mechanics (6 ECTS)
- › Inorganic materials or structural analysis (6 ECTS)
- › Theory of chemical bond (6 ECTS)
- › Solid state physics (6 ECTS)
- › Phase transitions and kinetics / Physical chemistry of polymers (6 ECTS)
- › Spectroscopy (6 ECTS)
- › Quantum chemistry and molecular simulation (6 ECTS)
- › Research project / English (6 ECTS)

Year 2:

Courses are in English

- › Molecular simulation (6 ECTS)
- › Photonics, lasers and imaging (6 ECTS)
- › Dielectric and magnetic properties / Large scale facilities / Auto-assembly, polymers and surfactants / Hybrid and nano-materials (6 ECTS)
- › Entrepreneurship / Management / English (6 ECTS)
- › Professional project (6 ECTS)
- › Master thesis: 5-month international internship in an academic or industrial environment (24 ECTS)

→ And after?

After graduation, students are fully prepared to pursue doctoral studies and a career in research. They may also work as scientists or R&D engineers within the industrial field.

Associated business sectors:

- › Chemical analysis
- › Chemistry of the atmosphere and environmental science
- › Energy and photovoltaic technologies
- › Nanotechnologies
- › Aeronautics and space
- › Chemical industries, pharmaceutical technologies
- › Fine chemicals and cosmetics
- › Forensic science and artwork restoration
- › Molecular modeling and simulation

Academic research domains:

- › Spectroscopy / analytical chemistry
- › Astrochemistry
- › Properties of materials, solid state physics, reactivity at the interfaces
- › Nanotechnology
- › Imaging, bio-detection
- › Organic electronics, optoelectronics, and photonics
- › Theoretical chemistry, molecular modeling and simulation etc.

Other possible activities:

- › Teaching, education and dissemination of scientific knowledge
- › Linking public and private actors in research, development and marketing
- › Participating in the purchase and investment of scientific equipment

Contact

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<http://masterpccpbordeaux.wix.com/pccp>

How to apply?

- › Applications may be completed online:
<http://masterpccpbordeaux.wix.com/pccp>



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