



People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research
Sétif 1 University – Ferhat Abbas

Faculty: Sciences

Master's Degree in Physic-Chemistry

Presentation and aims of the specialism :

- The Academic Master's in Physical Chemistry guarantees academic training in the field of Materials Science. The focus is on the design, synthesis, characterisation and development of new materials with optimal physico-chemical properties. The essential aim of this course is to provide students with the theoretical foundations and experimental know-how they need to master the science of materials, namely: chemical precursors, their exploitation, their physico-chemical and catalytic properties and their applications in various economic processes.

Entry requirements:

- A degree in Chemistry
- Placement in the academic curriculum

Career prospects :

- Developer of new conductive or insulating materials
- Developer of semi-conductors
- Specialist in renewable energies
- Application of catalysis and photocatalysis in various industrial fields
- Laboratory analyst

Organisation of studies and official duration of the programme:

Overview of the programme :

Semester 01 :

Molecular and quantum physical chemistry
Advanced kinetics and thermodynamics
Advanced electrochemistry
Structural analysis methods
Methods for developing thin-film materials
Practical chemistry-physics
Inorganic Chemistry TP
In-depth organic chemistry
Data analysis in chemistry
English

Semester 02 :

Physical chemistry of surfaces and interfaces
Coordination chemistry
Conjugated organic materials
Electrochemical analysis methods
Energy and nanoscience
Physical Chemistry Practical Training
Organic chemistry practical work
Organometallic chemistry
Computer science for chemistry
English

Semester 03 :

Physics of inorganic semiconductors and components
Methods for producing nanostructures
Nanostructure characterisation techniques
Molecular engineering
Near-field microscopy
TP Materials Elaboration
TP Characterisation of materials

Semester 04 :

Work placement in a research laboratory or company, culminating in a dissertation and oral presentation.

Curriculum strengths :

The Master's in Physical Chemistry is distinguished by its rigorous, multidisciplinary approach to chemistry, combining fundamental concepts with concrete applications in various fields. Strengths include a solid theoretical foundation, a quantitative and descriptive approach to chemical systems, as well as an opening onto organic chemistry and the macroscopic and microscopic approach.

Physical chemistry has applications in a wide range of fields, including materials science, chemical engineering, biophysics, environmental sciences and the development of new technologies (energy storage, catalysis, drug design).

Chemistry-physics enables students to develop key skills such as critical thinking, quantitative analysis, problem solving and scientific communication.

In addition, it emphasises the ability to join university research teams to carry out academic work (doctorate or other advanced studies).

Admission information:

The current application of articles 171 and 1023 of the decrees:

- The acquisition of skills and knowledge is assessed every six months through continuous assessment and a final examination.
- Passage from the first to the second year is automatic if the student has completed the first two semesters of the training programme.
- Depending on the programme, students are assessed on the basis of lectures, practical work, tutorials and practical placements.

Basic modules of the course :

- Molecular and quantum physical chemistry
- In-depth electrochemistry
- Structural analysis methods
- Methods for developing thin-film materials
- In-depth organic chemistry

- Electrochemical analysis methods
- Data analysis in chemistry
- Computer science for chemistry
- Physical chemistry of surfaces and interfaces

Advanced modules :

- Coordination chemistry
- Conjugated organic materials
- Organometallic chemistry
- Physics of inorganic semiconductors and components
- Energy and nanoscience
- Molecular engineering
- Advanced kinetics and thermodynamics

Language of teaching:

French and English

Training outline :

The tables provided in the previous section 'Programme Overview'.

Programme coordinator: S.AOUN

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