

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

Faculty: Sciences

Master's Degree in Materials Physics

Presentation and objectives of the speciality :

- This training offers a unified approach to the description of materials. The curriculum focuses on the chemical and physical properties of materials, as well as their production processes and applications.

Having become a top priority in many universities, the main aim of materials science is to determine the relationship between the structure of materials and their microscopic and macroscopic properties.

This master's degree also aims to train high-level specialists in solid-state physics and materials.

Admission requirements:

- Admission to the course is based on a review of applications from holders of the following qualifications:
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- Licences in physics: Fundamental physics, Physics of materials.
- Chemistry degree: Chemistry of materials.

Career Prospects/Professions:

- This will pave the way for theses in different types of materials, ranging from bulk to innovative materials: semiconducting polymers; nanomaterials for spin electronics; catalytic nanomaterials, oxides and ceramics, molecular materials.
- To train senior managers with sound knowledge of the sustainability and life cycle of materials, and therefore capable of implementing sustainable development research (development, implementation, materials and multi-materials).

Organization of Studies and Official Duration of the Program:

Program Overview:

Semester 01:

- POEM
- Organisation of matter
- Quantum mechanics
- Statistical thermo.
- Molecular chemistry
- Characterisation techniques
- Personal project 1
- Artificial intelligence applied to science and technology
- English 1

Semester 02:

- PMM
- Materials class
- Molecular Chemistry
- Computing
- Practical work
- personal project II
- laboratory internship
- Management
- English II

Semester 03:

- Approaches to the N-body problem and electronic structure
- Magnetism and Resonance Spectroscopy or Magnetic Properties Calculus
- Molecular materials or Wave propagation
- Catalysis or ab initio calculation
- Physical and chemical surface properties of inorganic materials
- Semiconductors and components
- Personal project III
- Elaboration and Characterisation of M.C. or Initiation to calculation codes
- Introduction to start-ups and entrepreneurship
- English III

Semester 04:

• Personal work placement or work placement in pairs, in a laboratory or company, culminating in a dissertation and presentation to a panel of teacher-

Training Canvas:

- Material organisation
- Quantum mechanics
- Semiconductors
- Statistical thermodynamics
- Molecular chemistry
- Technical characterisation
- Advanced training modules:
- Molecular Materials or Wave Propagation
- Catalysis or ab-initio calculation.
- Surface Physical Chemical Properties of Semiconductors and Components.
- Introduction to start-ups and entrepreneurship

Language of instruction:

French and English

Training framework:

The tables provided in the previous section "Program Overview"

researchers. The work placement will involve the development of materials in the form of thin films, nanopowders, nanowires, etc., characterisation techniques or calculations of the physical properties of materials.

Curriculum Highlights:

The aim of this programme is to provide students with solid training through research in a field that is a major generator of employment at international level. This training should enable them to work in both applied and fundamental fields. Similarly, although the primary aim of the proposed course is to train future PhD students in materials science, the possibility of direct integration into the world of work at the end of the course is not ruled out.

Admission Information:

The master's degree in "materials physics" enables:

a/ The training of young physicists specialising in the characterisation and analysis of materials. In addition to teaching, will they study and solve problems encountered by industry. The long-term objective is to develop and implement highperformance materials for national industry.

To offer students embarking on the Master's programme a broad scientific culture in the field of materials, with a focus on physics, designed to build on previous experience.

b) To cover the major aspects of materials science, from chemistry, development and processes the physico-chemical, to and physical mechanical properties of inorganic, organic and multi-functional materials. The aim is to provide students with

in-depth knowledge of the various basic sectors of the discipline. At the end of this Master's-level course, the candidate will have the necessary skills to pursue research in the field (preparation of a thesis), with the possibility of increased involvement at local level thanks to the local research structuring project, while also offering an international outlook.

c) The future student in materials physics will have a certain mastery of current calculation codes for simulating the physical properties of solid materials and comparing them with experimental theory. Propose or predict n

Coordinator of the Program: Dr. SAOUDI Amer

Contact: sa_am19@univ-setif.dz