

Master of engineering in **Electrochemistry** and **Processes for the Energy and the Environment**



PRESENTATION

The Master Electrochemistry and Processes for the Energy and the Environment (EPEE) addresses the ways (i) to optimize materials and energy flows for industrial production, transportation, and recycling but also (ii) to efficiently transform chemicals into electrical energy or the inverse (electrochemical generators or electrolyzers). Electrical energy storage and transformation, optimal design and upscaling of industrial processes, (electro)chemical transformations, and material processing by physical and/or (electro)chemical means as well as metal deposition (e.g. in microelectronics) are some master topics of this specialty. Some courses are taught in English, both at the Master 1 and Master 2 levels (see website for details). The specialty delivers a Master's Diploma from the Phelma School of Engineers.

INDUSTRIAL SECTORS

The specialty mainly covers two types of activities: consulting in engineering and research & development. Various sectors are addressed: metallurgy (surface treatment, corrosion, steel, and special industries e.g. nuclear applications), general chemistry (inorganic chemistry, electrosynthesis in aqueous electrolytes or molten salts), mining (refining, issues in corruptions), energy (fuel cells, batteries, hydrogen production and storage, thermal applications in general), recycling (metal recovering, metal refining), environmental issues (water, air and soil treatment, optimal thermal design) and nuclear energy (fuel processing, decontamination, safety). Now the energy industry (batteries, fuel cells, and energy storage) is increasingly attractive to EPEE students.

RESEARCH

EPEE courses are given by professors, assistant professors, and researchers working in two internationally known laboratories: the LEPMI (Laboratory of Electrochemistry and Physical-chemistry of Materials and Interfaces) and SIMAP (Science and Engineering for Materials and Processes). These two laboratories are recognized worldwide in the domains of corrosion, electrochemistry for energy applications, and material processing from the atomic scale to the plant. They both offer each year many opportunities for internships and thesis (industrial or academic grants) to Phelma students.

ASSETS

The EPEE specialty is strongly positioned in the research & development sector, essentially following the positive feedback of the industrial actors who employ our engineers. This positioning is the consequence of the excellence of the teaching platforms in electrochemistry and process engineering. Students have access to semi-industrial apparatus for chemical engineering and leading equipments for electrochemistry, situated close to or into the research laboratories. Students also have access to the material characterization platform of LEPMI and SIMAP (CMTC) for their projects, where advanced equipments are available: SEM, FEG-SEM, XRD, FIB, etc. Students are supervised by teachers who also are active publishers in international journals and responsible for many industrial projects, offering many opportunities for EPEE students during and after their scholarship.



PRESS RANKINGS



Shanghai

Since 2020, Grenoble INP - UGA has contributed to the international ranking of the University of Grenoble Alpes

Shanghai Global 2022

Grenoble Alpes University ranked among the 150 best universities in the world and in the top 5 of French universities.



QS 2023 ranking by theme: Grenoble INP - UGA makes good progress in the field of engineering and technology

Grenoble INP - UGA has made good progress in the overall field of "engineering and technology", moving up 74 places to 93rd position worldwide and 5th position in France, making it the leading institution outside the Paris region. The institute has made eight appearances in this ranking.



REUTERS

Grenoble INP - UGA leader in 2 lists from Reuters Ranking 2019

Most innovative universities in Europe

- 2nd of the French Engineerings Schools
- 13th in France

Grenoble INP - Phelma, UGA is the school for scientific diversity. It offers its students courses in various fields with a promising future:

- **Microelectronics and nano-technologies** (electronics, nanosciences, materials, health),
- **Decarbonated energy** (nuclear energy, photovoltaic, electrochemical storage),
- **Information technology** (digital communication, image and signal processing, telecommunications, computing and networks, Internet of Things, artificial intelligence),
- **Innovative materials** (for aeronautics, automobiles, sport & leisures, health, microelectronics, energy),
- **Biotechnology and biomedical engineering** (medical imagery and therapy, implantable devices),
- **Sustainable development** (decarbonated energies, eco-processes, recycling, material durability, energy management, natural signal analysis).

Based in Grenoble in the heart of the French Rhône Alpes region, Phelma boasts a rich academic and industrial infrastructure. As the only teaching institute on the Minatec innovation campus, Phelma benefits from an exceptional Training / Research / Industry synergy.



1,400 students
380 + Engineering graduates a year
+ More than 25% of engineering go on to complete a thesis

110 permanent teacher-researchers from
11 laboratories associated with the school
Approximately 370 stakeholders from industry and research

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