

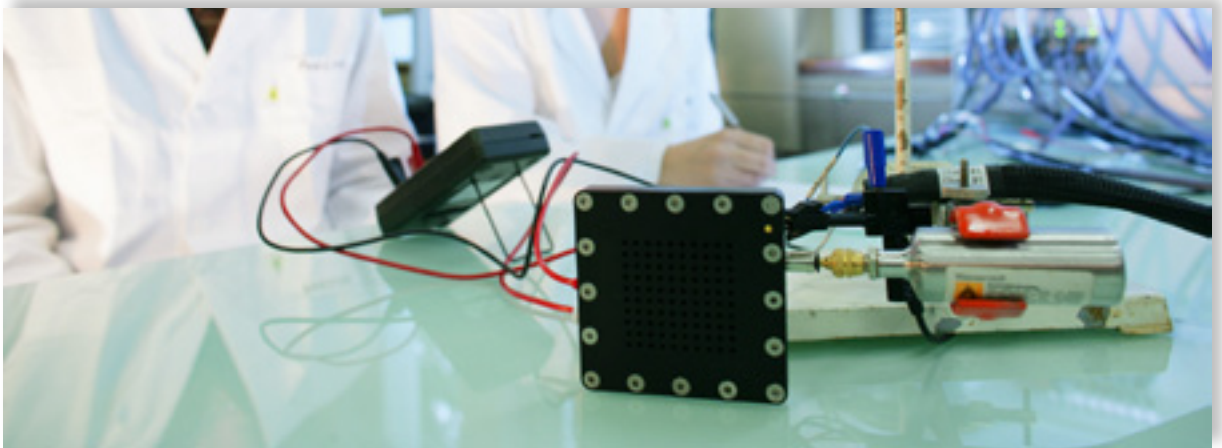


Master of engineering in

## Electrochemistry and Processes for Energy and the Environment

### PRESENTATION

The Master **Electrochemistry and Processes for the Energy and the Environment (EPEE)** addresses the ways (i) to decrease matter and energy consumption for industrial production, transportation and recycling but also (ii) to efficiently transform chemicals into electrical energy (in electrochemical generators: batteries and fuel cells). Electrical energy storage and transformation, optimal design and dimensioning 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. Two options are offered: Electrochemistry and Chemical Engineering. Some courses are taught in English, both at the Master 1 and Master 2 levels (see website for details). The specialty delivers a Master Diploma from the Phelma School of Engineers.



### INDUSTRIAL SECTORS

The specialty mainly covers two types of activity sectors: **production and research and development**. Engineers in production usually address the sectors of **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 corrosions), **energy** (fuel cells, batteries, hydrogen production and storage, thermal applications in general), **recycling** (metal recovering, metal refining) and **environmental issues** (water, air and soil treatment, optimal thermal design). The R&D sectors addressed are broader : historically, metallurgy, corrosion and nuclear industry were the most representative sectors. 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 surfaces 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 of 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 feed-back 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 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 of many industrial projects, offering many opportunities for EPEE students during and after their scholarship.



## CONTACT

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<http://phelma.grenoble-inp.fr>

Grenoble INP - Phelma is the school for scientific diversity. It offers its students courses in various fields with a promising future: **micro and nano-technologies** (micro / nano-electronics, nano-sciences, materials, health, building, etc.), **energy** (nuclear energy, renewable energies, accumulators, etc.), **innovative materials** (for aeronautics, automobiles, sport & leisures, health, microelectronics, energy, etc.), **information technology** (digital technologies, image and signal processing, telecommunications, computer science & networks, embedded softwares, etc.), **biomedical engineering** (medical imagery and therapy, implantable devices, etc.) and the **environment** (eco-processes, energy management, natural signal analysis, etc.).

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.

**Key figures:** more than 1,200 students, plus 300 engineering graduates a year, 150 permanent research lecturers from the school's thirteen partner laboratories, 200 speakers from industry and the world of research, plus 25% of engineering students studying for doctorates.

## PRESS RANKINGS



Grenoble INP, leader in 2 lists from QS World University Rankings Engineering & Technology 2014



Grenoble INP ranked 2nd by L'Usine Nouvelle among the 100 best french engineering schools in 2014



Grenoble INP ranked 1st by « Industrie et Technologies » in 2013



Grenoble, ranked 5th World's most inventive city by Forbes in 2013

