Perspectives for graduates

Graduate students from SRE-HGM are recognized by major and service companies of the oil industry and research centres. They are recruited worldwide by major industrial oil and gas companies and contactors such as Total, Schlumberger, Beicip-Franlab, Gaz de France, CGG, Paradigm, Shell, Chevron, Exxon-Mobile, BP, EMGS, Statoil, Soultz Geothermy and others.

Graduate students can work in non-petroleum areas related to the problems of aquifer management, geothermal energy, CO2 storage, radioactive waste storage, mining engineering and various aspects of environment.

The SRE-HGM master diploma also offers the possibility to follow a research career via doctoral studies in international research centers.

Host Research Laboratories

The host research laboratories in Nancy belong to the Research Federation in Mechanics and Energy and to the Research Federation in Geosciences and Environment, in particular:

LEMTA : http://lemta.ensem.inpl-nancy.fr
CRPG : http://www.crpg.cnrs-nancy.fr
G2R : http://www.g2r.uhp-nancy.fr

Other French laboratories are also accessible:

Institut Jean Rond d'Alembert, University Paris-6; Laboratoire Transferts Ecoulements Fluides Energétiques, ENSAM Bordeaux; Institut de Physique du Globe de Paris; Géosciences Rennes – University Rennes 1; Laboratoire Géosystèmes – University Lille I ; University of Provence ; School of Mines – Paris Tech.

In Nancy, the dominant role play the research groups «MFPM: Multiphase Flow and Porous Media» (associated to LEMTA) and the group "Gocad" (CRPG) are actively participating in the SRE-HGM Master programme.

Admission

All international applicants must have at least a bachelor's degree in one of the following disciplines: physics, mechanics, applied mathematics, computer science or numerical modelling, geophysics, reservoir engineering, petroleum geosciences, as well as students and professional candidates seeking a career evolution are welcome. Applicants must validate their diploma to European level. A good level in English is required and must also be validated.

All candidates are selected on the grounds of their application. In particular cases they may be invited to an interview (a video-conference is possible).

Tuition fees and costs

The tuition fee for the master-degree program is of the order of 12K€ per year. Along with this, students should possess a personal budget sufficient to cover living expenses including accommodation, food, transport and health care. The student card (delivered after enrolment) provides discounts for transport, access to university restaurants and the French national health case system.

The best students have an opportunity to obtain financial support via the Master Jury or our industrial partners. Such support covers all the tuition fees.

Application form and deadline

To obtain an application form, please contact the SRE-HGM secretary:

Sandie FANTIN
International Master – ENSG – INPL
Rue du Doyen Marcel Roubault, BP 40
F-54501 Vandœuvre-lès-Nancy Cedex – France
Sandie.fantin@ensg.inpl-nancy.fr

The completed dossier should be mailed before 29th May to the above address

National Polytechnic Institute - Nancy
High Geology School
High Mechanics & Electricity School

International Master

Subterranean Reservoirs of Energy: Hydrodynamics, Geology, Modelling

SRE-HGM

Master heads:

Mikhail PANFILOV
mikhail.panfilov@ensg.inpl-nancy.fr
03 83 59 56 97

Christian MOYNE
christian.moyne@ensem.inpl-nancy.fr
03 83 59 56 97

Objectives

The objective of this Master program is to train specialists for combined engineering and scientific careers. The strong professional engineering specialisation determines the difference of this master from all other scientific programs in this domain. At the same time, the parallel strong scientific specialisation makes this master distinct from all other professional programs.

SRE-HGM trains students in the following domains:

- Hydro-thermodynamic processes during the exploitation of different types of subterranean energy reservoirs.
- Engineering methods of predicting, controlling, modelling, and optimising recovery scenarios;
- Simulation and 3D-modelling of reservoir geological structures and reservoir dynamic processes.
- Reservoir geology and geophysics.

Training organisation

The training period is 2 years, starting in September:

- 18 months of academic courses at the INPL
- 6 months of industrial or research internship

For each year, students should validate 60 European credits. One semester validates 30 credits. The first three semesters represent academic studies – theoretical and practical courses given by national and international experts. The last semester (30 credits) is devoted to the research or industrial internship.

The training is organized within the scope of a unique speciality which offers two branches in second year:

- IHR: Reservoir Hydrodynamics and Engineering
- GN-GP: Numerical Modelling and Petroleum Geosciences

Students must be able to speak, read and write in English to a competent level before starting this programme. **All lectures are given in English**.

Programme of studies – 1st year

First Semester

- French
- Structural geology
- Sedimentology and stratigraphy
- Mathematics : differential equations
- Numerical methods
- Fluid mechanics
- Computer science and advanced programming
- Geodynamics
- Geophysics: wave propagation
- Subterranean hydrodynamics

Second Semester

- Oil genesis in petroleum geosystems
- Seismic data acquisition and interpretation
- Transport in porous media
- Theory of viscous flow
- Thermodynamics of compositional fluids
- Multiphase flow in porous media
- 3D geological modelling
- 3D hydrodynamic modelling with ECLIPSE
- Petrophysics
- Geostatistics
- Geophysics: seismic imagery
- Geochemistry of saturated rocks
- M1-project on “Numerical techniques of reservoir flow modelling”

Each module consists of 25h. The evaluation is done by oral or written exam or by a mini-project.

The last part of the second semester is devoted to a M1 research project, which consists of creating a 2D numerical model of a hypothetic scenario of reservoir exploitation. The project (60 hours) validates 6 credits.

During the summer recess, students can do a first short internship, which is not however obligatory.

Programme of studies – 2nd year

Third Semester

Common modules:

- Applied geophysics
- Advanced geological modelling with GoCad
- M2 research project

Elective modules:

- Unconventional Energy Reservoirs
- ISR: in-situ recovery of metal and uranium ores
- Field case

Branch IHR:

- Theory of natural drive mechanisms
- Physico-chemical hydrodynamics of enhanced oil recovery
- Well drilling and completion
- Well testing, production and stimulation
- Numerical simulation of reservoir dynamics (ECLIPS)
- Gas Reservoirs and Storages
- Capillarity and wetting in multiphase systems

Branch GN-GP:

Choice 1:

- Algorithms and object-oriented languages
- Environments of development, interfaces and software project
- Computer aided design and graphics for natural objects
- Structural analysis in oil exploration
- Discrete modelling of natural objects

Choice 2:

- Structural analysis in oil exploration
- Clastic reservoirs
- Carbonate reservoirs
- Basin case studies
- Borehole geophysics

The Field Case represents the simulation of an exploration and recovery project on a real oil and gas field which involves constructing the exploration and appraisal of the reservoir, followed by geological modelling and simulation of oil-gas recovery scenarios. This multidisciplinary work takes 3 full weeks and finishes with competitive presentations of each team’s results.

Fourth Semester

The last semester is devoted entirely to an internship in research or industry. It concludes by the preparation and the defence of the Master thesis. The internship period is 6 months and can be done anywhere in the word. The defence takes place in July or September.