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# MASTER GEMS 2022-2023

Geoscience for Energy  
Eni Master School

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2<sup>nd</sup> edition



# IL MASTER

## Scenario

The energy sector is undergoing major changes, driven by the need to decarbonize and to develop the alternative and complementary energy resources to replace hydrocarbons, resulting in the development and implementation of new business models.

Since 2014, Eni has been committed to being a major player and an active contributor to the energy transition by transforming and diversifying its business with the strategic goal of becoming a Carbon Neutral Company by 2050.

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## Exploration in Eni

Knowing where to start before starting: Exploration is the first step in the energy cycle; it requires the collection and interpretation of all the information needed to identify the best opportunities for developing geo-resources. Eni has been a world leader in exploration for years thanks to an integrated approach involving all the disciplines of geosciences. This approach allows the Company to model the subsurface using its own software and technologies developed through continuous research. These innovative technologies are regularly and successfully implemented in the exploration process, using the capabilities of Eni's GreenData Supercomputer Center.

Eni's experience in geo-resources research has enabled the Company to develop methodologies and technologies that allow for efficiency while minimizing the environmental impact of its operations. Through the energy transition, the concept of exploration has been expanded to include new, progressive objectives such as exploring for the 'Critical Elements' required for the energy transition (e.g. Lithium) and for other geo-resources such as geothermal energy.

## Why the GEMS Master's?

GEMS is a high-level training course, delivered within the Company, which aims to complete the academic background of young graduates and to prepare new professionals to face the complex challenges of the energy transition. The programme offers participants the opportunity to acquire soft skills and a unique vision of the energy sector of geo-resources, essential elements required to face the digital future and to actively support the transition to more sustainable energy sources.

## The Master's aims

- Preparing students to apply geoscience in multidisciplinary and multicultural contexts, directed towards research and development of geo-resources to support the process of decarbonisation and energy transition.
- Developing soft skills (project management, team working, communication)
- Strengthening cutting-edge areas of expertise related to technological innovation (e.g. big data, machine learning, artificial intelligence, etc.).

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### Who are we

Eni is an integrated energy company with more than 31,000 employees in 69 countries around the world. In 2021, the company launched a new strategy that will enable it to provide a variety of fully decarbonized products, combining environmental and financial sustainability. The recent merger of the renewable and retail businesses in Plenitude (formerly Eni gas e luce), the development of bio-refineries and biomethane production, and the sale of low-carbon energy carriers and mobility services at service stations are among the main levers for taking the path towards decarbonization.

Eni aspires to contribute to the achievement of the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda, supporting a just energy transition that meets the challenge of climate change with concrete and economically sustainable solutions by promoting efficient and sustainable access to energy resources, for all.



### Who are looking for?

We want young people capable of exploring for the energy and geo-resources of tomorrow and ready to take on the enormous challenges of technological innovation that the energy transition process requires. People able of delivering the new future of energy and geo-resources.

### Requirements

A Master's degree in any one of the following disciplines: Geological Sciences and Technologies; Geophysical Sciences; Environmental and Territorial Sciences and Technologies; Electronic Engineering; Mathematics; Physics and Mathematical-Physical Modeling for Engineering.

A Master's degree mark of not less than 100/110 (or equivalent for foreign qualifications) or average exams equal to or greater than 27/30.

Not more than 28 years old on December 31, 2022.

Excellent knowledge of English.

**Thinking about the future: what could students do at Eni after this Master's degree?**

The Master's students, with their different backgrounds, will be able to carry out various activities in Eni

**Geologists**

Studying the phenomena that control the formation of natural resources, including sedimentology, stratigraphy, petrography, structural geology, geochemistry, geotechnics, environmental geology, geothermal energy; developing, in multidisciplinary teams, conceptual and numerical three-dimensional models of outcropping and subsurface geological structures and their physical properties; following the activities of drilling both onshore and offshore wells and providing a description of the rocks and fluids encountered; performing the assessment of the hydrogeological or seismic risk associated with the activities and implementing the appropriate risk mitigation actions; elaborating environmental impact studies; setting up monitoring plans for both the surface and subsurface aspects of fluid storage projects (CO<sub>2</sub> and H<sub>2</sub>).



### **Geophysicists**

Processing and studying the propagation of seismic waves in the subsurface; using the three-dimensional numerical modeling of subsurface structures in order to represent and exploit potential reservoirs in the best possible way; developing algorithms and technical-scientific codes; using the results of Big Data analysis, integrating all possible geological and geophysical numerical information; applying their specific skills in the mathematical and physical aspects typical of subsurface modelling.

### **Engineers**

Developing algorithms and technical-scientific codes aimed at geological and geophysical applications; using and optimizing proprietary high-performance code (HPC); carrying out the de-risking assessments of infrastructure on the seabed or in sensitive areas from the point of view of environmental impact; working on the development of the different energy sources; developing new algorithms for Big Data analysis (both in real time and static) to support the monitoring of operations; applying their specific skills in the mathematic and modelling aspects.

### **Mathematicians**

Developing mathematical models for geology and geophysics; implementing algorithms to support geology and geophysics studies; carrying out uncertainty and risk analyzes in the context of exploration; using innovative technologies to manage large amounts of data and recognize possible correlations between geological and geophysical data; implementing three-dimensional numerical modelling in order to represent and estimate the volumes of potential geo-resource deposits; applying their mathematical and modeling skills to facilitate the integration of data and the interpretation of models by end users.

### **Physicists**

Using and implementing three-dimensional numerical modelling in order to represent and estimate the volumes of potential geo-resource deposits; developing models for geology and geophysics; developing high performance technical-scientific algorithms and codes (HPC); supporting geologists and geophysicists in the interpretation of data and results of numerical simulations to reconstruct the ge-

ological evolution of the sedimentary basins and to estimate the fluids presence in the subsurface; performing environmental impact studies.

The extraordinary computing potential of Eni's HPC-Green Data Center is available to all these professionals, to achieve the best definition of complex data processing with a reduction in computational time.

### **The Master's Programme**

The Master's will last 11 months, will be held at the headquarters of Eni Corporate University in San Donato Milanese (MI) and / or in distance mode, depending on the health situation and will be in English. The Master's programme will consist of classroom courses and seminars, case studies, field trips and an entire month will be dedicated to the development of an Exploration Project. The lessons will be taught by a team of national and international academic teachers and Eni experts who will transfer the technical knowledge gained through their professional experience. Students will have the opportunity to follow a preparatory path of knowledge alignment, planned for a more effective participation in the Master.



### **Master's modules**

**Alignment module:** basics of Geology and Geophysics applied to the search for energy sources.

**Energy Transition Module:** the path of the current energy scenario towards a sustainable future; Eni's approach to the energy transition and research by identifying alternative energy solutions; communicating the energy transition effectively; the role of critical minerals and geothermal energy in the energy transition; diversification for decarbonisation: the circular economy, CCUS, H2.

**Geophysics module:** indirect, seismic and non-seismic methods of subsurface investigation for the reconstruction of the geological model; seismic signal modeling and analysis; use of technologies for monitoring fluid storage sites such as CO2 or H2.

**Geology module:** detection and analysis of subsurface data; characterization of rocks capable of containing and storing fluids; study of the tectonic structures that regulate the circulation of fluids in the subsurface; reconstruction of geological



models and their evolution; descriptive and predictive modeling of geological sites with potential for mining, geothermal, storage of CO<sub>2</sub> or H<sub>2</sub>.

**Energy Exploration Module:** identification and characterization of a mining or CO<sub>2</sub> storage objective; technical assessment of its potential and associated economic value; analysis of the connected risk; exploration and geosciences in the development of renewable energies and in scientific research aimed at finding differentiated and /or integrated energy solutions.

**Energy Policies / Big Data / Data Science:** advanced technologies and approaches for the organization, management and understanding of a large amount of data collected for successful, effective and sustainable exploration.

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### **Business supports**

No enrollment fee is foreseen. All admitted students will receive from Eni a scholarship of € 1,000 gross monthly, if of Italian nationality, and € 1,300 gross monthly, if of non-Italian nationality, for the entire training period (11 months).

### **Selection mode**

Participants will be selected by Eni, based on its own policies, through aptitude and technical tests.

### **Timing**

Deadline for applications: June, 13, 2022

Selection tests: July 2022

Master's start: September 2022



## Eni Corporate University

For more detailed information regarding the requirements,  
deadlines and methods in order to send the application form,  
[select eni.com](http://select.eni.com)

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For more info regarding this Master's programme  
Ph.: +39.06.598.895.39 +39.06.598.850.01