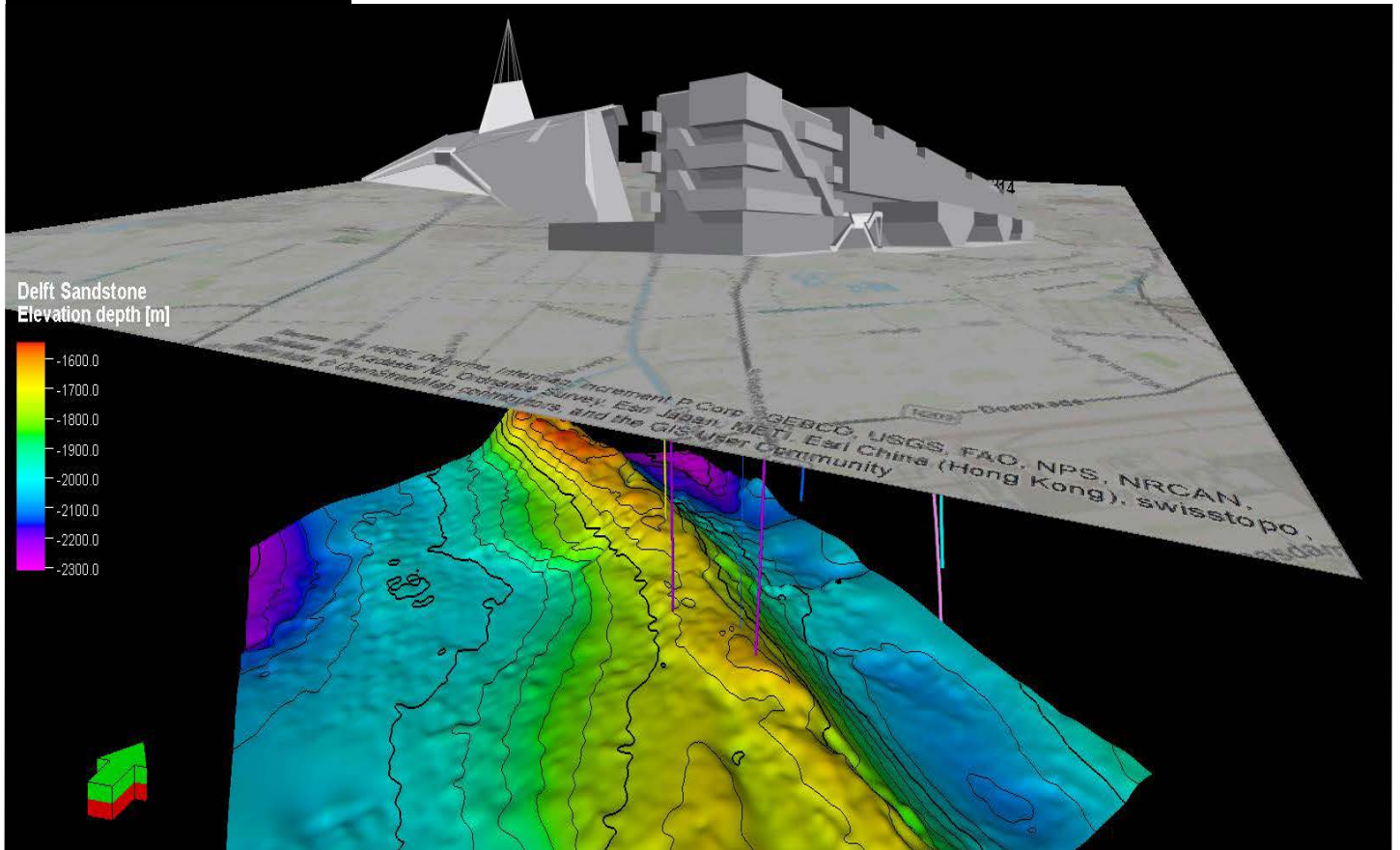


# Applied Earth Sciences

## Geo-Energy Engineering

### MSc Programme



The subsurface provides us with crucial sources of energy and materials, such as geothermal, natural gas, and petroleum. In addition, the subsurface can act as a crucial storage place for waste and energy. With growing demands due to growing world population and ongoing climate change, the need for sustainable subsurface usage is very urgent. Geo-Energy engineers are fully equipped to address these challenges.

<b>Degree</b>	Master of Science
<b>Starts</b>	September
<b>Type</b>	full-time
<b>Credits</b>	120 ECTS, 24 months
<b>Language</b>	English
<b>Application deadline</b>	1 April: International students 1 July: Dutch degree
<b>Tuition fee</b>	€ 18.750 (non EU) € 2.168 (EU)
<b>Scholarships</b>	<a href="https://www.scholarships.tudelft.nl">scholarships.tudelft.nl</a>

Geo-Energy engineers have a thorough knowledge of the rocks and structures and rock-fluid interactions in the subsurface enabling them to simulate, predict and monitor processes of deep-subsurface use. This requires an understanding of their underlying physics, chemistry, and geology. Geo-Energy engineers have the ability to identify, characterize, and monitor the rocks and structures best-suited for the various purposes, and to design interventions minimizing the economic and environmental risks in a responsible and sustainable manner. Since only a fraction of the subsurface characteristics can be observed, Geo-Energy engineers need to make

decisions based on limited data and associated uncertainties in the available information.

### Programme and curriculum

Our programme is specifically designed to be interdisciplinary, combining geosciences and engineering. This makes it unique in the Netherlands and rare globally. The interdisciplinary nature of the programme ensures that we prepare students to address the complex subsurface challenges of our future in their professional career. Our programme continues in a long history of world-leading excellence in reservoir characterization, geophysical exploration and monitoring,

# Applied Earth Sciences Geo-Energy Engineering

FIRST YEAR	SECOND YEAR
ASSESSMENT AND DEFICIENCY COURSES (4EC) COMMON CORE APPLIED EARTH SCIENCES (11 EC) COMMON CORE GEO-ENERGY ENGINEERING (15 EC)	GEO-ENERGY ENGINEERING PROJECT (15 EC)
ELECTIVES (27 EC)	MSC THESIS (45 EC)
FIELD LAB (3 EC)	

laboratory study of subsurface physics and flow, numerical simulation and optimization of subsurface processes. We welcome ambitious students with a BSc in Applied Earth Sciences or a related science or engineering degree. The Geo-Energy Engineering programme consists of a unique combination of geology, physics, and engineering courses deepening the foundation of the BSc education. The variety in backgrounds of our students produce a high-level learning environment with specialists in different disciplines working together. After deepening basic skills and knowledge through a number of mandatory and elective specialised courses, most of the second year is devoted to a thesis research project. This programme allows students to develop generic Geo-Energy engineering research skills supplemented with one or various chosen subsurface specialisation(s).

## Graduation examples

Examples of thesis projects are:

- Simulation of fracture networks using outcrop data and interpretation
- Heterogeneity of the Delft subsurface for heat-flow modelling for optimal geothermal use
- Predicting the impact of geological processes, like climate change or subsidence, on subsurface rock properties
- Numerical simulation of earth dynamics at millimetre to kilometre scale to predict stratigraphy
- Simulation of geomechanical effects at depth due to deep subsurface engineering and predicting and monitoring their impact at the surface

- Dynamic simulation of hydrocarbon flow in heterogeneous geology
- Reservoir characterisation for geothermal production, storage, and hydrocarbon exploration
- Geophysical imaging and geologic interpretation to predict subsurface character

Upon request thesis projects can be conducted jointly with industrial collaborators. Some thesis projects lead to presentations at scientific conferences and publications in research journals.

## Career prospects

The ability to integrate geology, physics, and engineering and the skills to understand, simulate, image, characterize, and predict subsurface behaviour in the midst of considerable uncertainties enables those who study Geo-Energy Engineering to design sustainable solutions for the changing energy landscape. There is an increasing demand for engineers who can make the connection between the deep and the shallow subsurface at consultancy and contracting companies worldwide. Government institutions will continue to rely on Delft Geo-Energy Engineers to ensure safe and responsible use of the subsurface. In addition to jobs in the oil and gas industry, the upcoming field of geothermal energy and other sustainable subsurface applications form an exciting work environment for those who graduate from this track.



**15<sup>th</sup>**  
in QS World University  
ranking in Engineering and  
Technology



**16**  
first year students in 2020



**50%**  
international students



**87%**



**13%**



**96%**  
job as engineer