

CIVIL-428

Engineering geology for geo-energy

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Cursus	Sem.	Type
Civil Engineering	MA2, MA4	Opt.
Energy minor	E	Opt.

Language of teaching	English
Credits	3
Session	Summer
Semester	Spring
Exam	During the semester
Workload	90h
Weeks	14
Hours	3 weekly
Lecture	2 weekly
Exercises	1 weekly
Number of positions	

Summary

Objective is to provide an understanding of the problems in geo-energy projects. Underground as storage medium for carbon dioxide, heat storage and radioactive waste and as energy source like deep geothermal systems.

Content**Keywords**

structural geology, tectonics, natural and induced seismicity, stress measurements, borehole stability, hydraulic fracturing, deep geological disposal for radioactive wastes, deep geothermal systems, CO2 sequestration, heat storage

Learning Prerequisites**Required courses**

Soil mechanics, Geomechanics, Rock mechanics

Learning Outcomes

By the end of the course, the student must be able to:

- Construct a coherent geological model with the available data.
- Anticipate the rock mass and hydraulic perturbations for any subsurface projects (i.e. deep geothermal, CO2 storage, construction of deep geological disposal for radioactive waste).
- Design the rock mass and hydraulic perturbations for any subsurface projects (i.e. deep geothermal, CO2 sequestration, construction of deep geological disposal for radioactive waste).
- Use correctly the acquired data in the project for building a coherent interpretation.

Transversal skills

- Access and evaluate appropriate sources of information.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Demonstrate the capacity for critical thinking

Teaching methods

Teaching, exercises, personal project

Expected student activities

Attendance at lectures, completing exercises, reading selected scientific publications and doing a personal work

Assessment methods

During the semester, written control and personal work.

Resources

Notes/Handbook

- Elements of crustal geomechanics / Cornet F.H.

Moodle Link

- <https://go.epfl.ch/CIVIL-428>

Prerequisite for