Geothermal Drilling Engineering and Subsurface Technologies

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Module number	Credits	Workload	Semester[s]	Duration	Group size
SE-CO-22	5 CP	150 h	3. Sem.	1 Semester[s]	no limitation

Courses	Contact hours	Self-study	Frequency
a) Geothermal Drilling Engineering and Subsurface Technologies	a) 4 WLH (60 h)	a) 90 h	a) each winter

Module coordinator and lecturer(s)

Prof. Dr. rer. nat. Rolf Bracke

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Admission requirements

Recommended previous knowledge:

English language skills: "Test of English as a Foreign Language" (TOEFL): the test result in the internet version (iBT) should be at least 80 points, or "International English Language Testing System" (IELTS): minimum overall score "6" ("academic").

Learning outcome, core skills

The course provides an introduction to the principles of resource geology, deep drilling technologies, reservoir production and subsurface technologies. Students will learn how to evaluate a resource and propose suitable utilization concepts, plan a drilling project including well design, and select tools and equipment for reservoir production and monitoring. The lecture is accompanied by an exercise with practical examples and two excursions

Students will be able to:

- explain resource geology methods and parameters,
- define conceptual reservoir models
- tell principles of resource management
- compute thermal power outputs,
- explain the main methods and parameters of drilling technology
- develop drilling and production concepts,
- calculate casing designs,
- describe potential drilling problems,
- define the composition of the cost structure of a drilling project
- describe reservoir test principles,
- calculate production parameters

Contents

a)

- Introduction to subsurface technologies and applications
- Geothermal resource characterization: temperature, pressure, and, fluid flow in the geological subsurface + 1 excursion
- Geological and mininig law act

- Deep drilling basics (drilling rig, strings, and, bits) + 1 excursion
- Drilling techniques and processes (conventional and advanced drilling technologies);
- Casing design and calculation;
- Drilling fluid/mud system;
- Cementation and well control;
- Health safety and environment;
- Economics and Reporting;
- Well integrity and Logging technologies
- Monitoring techniques
- Reservoir production technologies
- Deep geothermal heat exchangers

Educational form / Language

a) Tutorial (1 WLH) / Lecture (3 WLH) / English

Examination methods

• Written exam 'Geothermal Drilling Engineering and Subsurface Technologies' (90 min., Part of modul grade 100 %)

• Semester-accompanying exercises

Requirements for the award of credit points

- Passed final module examination: written exam
- Passed semester-accompanying exercises

Module applicability

MSc. Mechanical Engineering

MSc. Geosciences

Weight of the mark for the final score

Percentage of total grade [%] = 5 * 100 * FAK / DIV

FAK: The weighting factors can be taken from the table of contents.

DIV: The values can be taken from the table of contents.

Further Information