SYLLABUS

Geochemical Modelling 7.5 credits L7013K

Geokemisk modellering

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2022-02-11

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LULEÅ TEKNISKA UNIVERSITET

Geochemical Modelling 7.5 credits L7013K

Geokemisk modellering

Second cycle, L7013K

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Geovetenskap	Earth Science and Physical Geography

Main field of study

Natural Resources Engineering, Geosciences

Entry requirements

90 credits in Geosciences, including the courses O0035K Geology, L0047K Environmental Geochemistry and L7021K Freshwater Geochemistry or equivalent. Good knowledge in English, equivalent to English B/6.

Selection

The selection is based on 30-285 credits

Course Aim

After completing the course participants should be able to

Knowledge and understanding
1. Discuss and explain on how geochemical modelling can be used to solve practical environmental problems.
2. Describe and explain the fundamental principles on which geochemical modelling is based.

Competence and skills
3. Apply the most common data processing programs for geochemical modelling.
4. Model basic geochemical processes.

Judgement and approach
5. Describe and discuss limitations and possibilities with geochemical models.
6. Critically evaluate and discuss how modelling can affect the geochemical interpretation of an environmental problem.

Contents

The course mixes theoretical background in the form of lectures and practical assignments where students work in groups to solve different types of geochemical issues such as mineral solubility and element speciation using geochemical modelling programs such as PHREEQC. The theoretical background explains the basis on which geochemical modelling programs are based. Theory of thermodynamics and local equilibrium are discussed. An important part of the course concerns possibilities and limitations of geochemical modelling and are discussed continuously through the course through theory and practical assignments to critically relate to modelling results.

Realization

Each course occasion´s language and form is stated and appear on the course page on Luleå University of Technology's website.
The teaching consists of a number of lectures that include classroom exercises and discussions for the students to get acquainted with the software that is mainly used in the course (PHREEQC) but also to stimulate discussions and critical thinking about geochemical modelling.

Four group exercises based on different geochemical problems are carried out and presented in written report. Through the exercises, students are actively trained in collaborating to solve complex geochemical problems and identify and critically examine relevant parameters and factors that may affect the resulting model. Furthermore, students are trained in their ability to present and visualize results by written reports of all assignments.

After completing exercises one and two, the students conduct an individual “peer review” on another group's report, which aims to strengthen the students' ability to give and receive constructive criticism.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.
The intended learning outcomes of the course are assessed by

- A written exam that examines goals 1, 2 and 5 (grade U/G 3 4 5)
- Four written group reports based on assignments examine goals 3, 4, 5 and 6 (grade G/U)

All included examination parts must be completed for the final grade on the course

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term “unauthorized aids” refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course L7013K is equal to KGL024

2500

Course offered by

Department of Civil, Environmental and Natural Resources Engineering

LULEÅ TEKNISKA UNIVERSITET

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0007	Group assignment I	U G#	1	Mandatory	A21	
0008	Group assignment II	U G#	1	Mandatory	A21	
0009	Group assignment III	U G#	1	Mandatory	A21	
0010	Group assignment IV	U G#	1	Mandatory	A21	
0011	Exam	G U 3 4 5	3.5	Mandatory	A21	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Last revised

by Assistant Director of Undergraduate Studies Eva Gunneriusson, Department of Civil, Environmental and Natural Resources Engineering 2022-02-11

Syllabus established

by the Department of Chemical Engineering and Geosciences 2007-02-28