

**SYLLABUS**

# **Chemical Reactions in Mineral Resource Engineering 7.5 credits P0007K**

**Kemiska reaktioner i hållbar mineralutvinning**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2022-02-11**

# Chemical Reactions in Mineral Resource Engineering 7.5 credits P0007K

## Kemiska reaktioner i hållbar mineralutvinning

### First cycle, P0007K

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Kemi	Chemistry

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language +

Upper secondary school courses English 6, Physics 2, Chemistry 1, Mathematics 3c or Mathematics D.

## Selection

The selection is based on final school grades or Swedish Scholastic Aptitude Test.

## Course Aim

After completing the course, the student shall be able to;

- Describe and explain chemical reactions involved in the extraction of minerals and metals.
- Describe and explain coupling of chemical reactions to processes involved in extraction of minerals and metals
- Exemplify environmental impacts and suggest solutions for sustainable minerals and metals extraction in oral and written form.
- Solve tasks with a scientific and technical approach

## Contents

The materials and chemical reactions involved in selected process steps will be analysed from different aspects as

- Chemical reactions involved, stoichiometry and how to balance these
- Reduction and oxidation, dissolution, precipitation, complex formation, acid/base
- Impact from structure of atoms and molecules for involved elements, chemical binding between these on the properties and behaviour during processing
- Thermodynamics, equilibrium, and reasons to possible deviation from equilibrium and limitations in reaction rates
- Coupling between thermodynamics, equilibrium constants and redox
- Chemical reaction systems and their behaviour at different temperatures

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course is given in English and includes lectures, quizzes and five individual assignments to hand-in. After hand-in feedback and discussion will be conducted in small groups (2-3 persons) to consolidate the knowledge. Each assignment will be coupled to a specific aspect in the process route) and will be a mix of exercises and questions. A project task will be conducted in small groups (2-3 students) and the outcome presented in oral and written report.

Two laboratory exercises will be conducted from which a written report will be handed in.

## 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 four different assessments:

1. Individual assignment assess (Grade U, 3, 4, 5)
2. A project assignment assess (Grade U, 3, 4, 5)
3. Two laboratory exercises including written reports (Grade U/G)

## 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.

## Course offered by

Department of Civil, Environmental and Natural Resources Engineering

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Five assignments, hand-in and oral discussions	G U 3 4 5	2	Mandatory	S23	
0002	Laboratory 1, written report	U G#	1	Mandatory	S23	
0003	Laboratory 2, written report	U G#	1	Mandatory	S23	
0004	Mini-project, written report and oral presentation	G U 3 4 5	3.5	Mandatory	S23	

## 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.

## Syllabus established

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