FAE3010 Environmental Geochemistry and Ecotechnology 7.5 credits

Miljögeokemi och ekoteknik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FAE3010 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

MSc in geosciences or environmental sciences. Knowledge in basic soil chemistry or water chemistry is recommended.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course, the PhD student should be able to:

- provide an overview of current research topics and discuss recent findings in the area of environmental geochemistry and ecotechnology.

- know the principles of important methods for material characterization, including X-ray powder diffraction and X-ray absorption spectroscopy.

- interpret and statistically treat chemistry data (spatially or temporally distributed) in a scientifically sound way, using spreadsheets or geochemical software.

- discuss how to design projects that address important research issues with state-of-the-art analytical techniques and results interpretation.

Course contents

The course includes a seminar programme. Eight seminars of which at least six must be attended to pass the course. Topics of the seminars:

- Current research rends in Environmental Chemistry and Ecotechnology.

- Binding of metals and nutrients in soil and ground. Mechanisms and environmental relevance.

- The arsenic problem in groundwaters - an overview.

- Use of ecotechnology for passive treatment of sewage and contaminated waters.

- Evaluating mineral phase composition by means of X-ray powder diffraction.

- Use of X-ray absorption spectroscopy to unravel speciation and structures.

- Geochemical modelling; overview of software and tools to interpret chemical data.

- Guest lecture on selected topic.

Between each seminar, participants should discuss defined aspects of each talk. Each seminar ends with discussion of the previous seminar.

Exercises:

- X-ray powder diffraction - data acquisition and interpretation.

- X-ray absorption spectroscopy - introduction to interpretation of EXAFS and XANES data.

- Speciation modelling with Visual MINTEQ.

In addition, a project work assignment is included in which course participants tackle data from own research with methodology related to the course.

Course literature

Research papers, book chapters, extracts from books. Details to be announced before start of the course.

Examination

- INL1 - Homework, 7.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

Participation in seminar discussions, solved exercise problems, completed project work assignment.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.