

ENV-504

Groundwater and soil remediation

Cursus	Sem.	Type
Environmental Sciences and Engineering	MA2, MA4	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	Oral
Workload	120h
Weeks	14
Hours	3 weekly
Lecture	2 weekly
Exercises	1 weekly
Number of positions	

Remark

Pas donné en 2023-24

Summary

This course covers the essential knowledge of contaminant partitioning and techniques to monitor chemical species, physical extent of contamination and biological processes. In the second part, remediation approaches are tackled. This course represents the fundamentals of remediation.

Content

Fundamental contaminant partitioning principles
 Microbial processes and their quantification
 Advanced monitoring techniques for contaminated sites
 Physical, chemical and biological approaches to remediation

Keywords

partitioning
 microbial processes
 bioremediation
 physico-chemical processes

Learning Prerequisites**Recommended courses**

General Chemistry
 General Biology
 Microbiology for engineers
 Soil science

Important concepts to start the course

Fundamentals of soil science, porosity, bulk density
 Major biological processes, sulfate reduction, denitrification
 Partitioning of contaminants between phases
 Groundwater flow

Learning Outcomes

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

- Synthesize information about a contaminated site
- Design a remediation approach appropriate for a given site

Transversal skills

- Use a work methodology appropriate to the task.

Teaching methods

Lectures, homework and a project (written report and oral presentation)

Expected student activities

The students are expected to attend the lecture, to work on the homeworks and be ready to ask questions during the homework session.

The project entails proposing an appropriate remediation approach for a given site, writing a report and presenting the project in an oral presentation.

Assessment methods

The written test is 50% and the oral presentation is 20% and the report is 30%. Which means that the project represents 50% (oral presentation and report).

Supervision

Office hours	No
Assistants	No
Forum	No

Resources

Bibliography

Reading assignments available on Moodle

Ressources en bibliothèque

- [Practical handbook of material flow analysis / Brunner, 2004](#)

Références suggérées par la bibliothèque

- [Handbook of material flow analysis / Brunner, 2nd ed., 2017](#)
- [Metabolism of the anthroposphere : analysis, evaluation, design / Baccini, Brunner, 2nd ed., 2012](#)

Notes/Handbook

Course notes available at the bookstore.

Moodle Link

- <https://go.epfl.ch/ENV-504>

Prerequisite for

Specialization in Environmental chemistry and processes