Remediation of Soils and Groundwater

Fall 2026

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Course organization

- Lecture: 2 periods
    - Presentation of material, quantitative examples
- Problem session: 2 periods
    - Preparation for exam and for project
    - Should have worked on the problem before the session
    - Work together in groups
    - Present material to rest of class
    - Not: the time to look at the problems for the first time
    - Not all homework assignments will be explicitly discussed in class
- Project: throughout the semester
- This year: optional visit to a contaminated site in Valais (Tamoil site, in Collombey-Muraz) November 16th (Monday)

Course organization

- Project:
    - Groups of 3 (self-assembled)- set by Sept 16th
    - Assigned raw data about a contaminated site by Sept 23rd
    - Summary of the relevant data => October 7th
    - **Present case study on a remediated site (assigned) => October 7th**
    - Selection of remediation strategy => November 11th
    - **Report => January 8th**
- **Final exam**: Nov 25th, 3 periods, course notes allowed (but not homework)
- **Project presentation**: exam period, 20 minutes of presentation and 10 minutes of questions
- Grade distribution: 10% case study, 30% report, 20% presentation, 40% final exam
- In bold: graded assignments/exams

Course organization

- Project:
    - Identify the contamination (concentration, location)
    - Consider the best strategy for remediation
    - Design the remediation strategy
    - Be quantitative! All data are not available but make assumptions and provide a quantitative design
    - Estimate the cost (input from engineering firm and US website)
    - Detailed questions about the design at the oral presentation
    - Three deliverables: data summary, selected strategy and report
    - Case study presentation (for another site) part of the grade

Course organization

- Data summary (not graded):
  - Provide an organized summary of the data so that it is easy to access them.
  - Go through the document(s) provided and extract the relevant data: contaminant types, concentrations, and locations (including depth).
  - Beneficial to map the contaminants
  - This assignment is due by 5p on October 7th (not graded).
  - You will receive feedback within 2 weeks. No feedback will be provided if the document is turned in late.

Course organization

- Selection of remediation strategy (not graded):
  - Present the remediation strategy you selected for your site.
  - Why did you select it, where and how will you implement it?
  - This assignment is due by 5p on November 11th (not graded).
  - You will receive feedback within 2 weeks. No feedback will be provided if the document is turned in late.

Course organization

- Report (graded):
  - The report should be 15-20 pages (plus appendices, if relevant).
  - Include a brief description of the site and the contaminants and any particular challenges.
  - Summarize your remediation approach and how it would be applied to this site, highlight your major findings and recommendations and clearly outline the advantages and disadvantages of the approach you are considering for this site.
  - Be quantitative in your design.
  - You will need to make assumptions about the site, state those assumptions and use them for your calculations.
  - The report needs to be clearly structured, and information should be organized in a logical manner.
  - The report is due January 8th by 5p as an electronic version sent by email to the instructor. No excuses (short of hospitalization) will be accepted. Penalty for late submission.

Course organization

- Case study presentation (graded):
  - Each group will present part of a case study (of a remediated site)
  - Assignments will be provided once the groups are formed
  - An example presentation will be given on September 9th
  - An oral presentation will be given by each group (on October 7th).
  - You will receive the document three weeks before you are due to present, so September 16th.

Schedule

- First 10 weeks, lecture, problem session, field trip, exam preparation, and project:
  - Contaminant properties
  - Microbial processes and their monitoring
  - Physicochemical monitoring
  - Introduction to groundwater rmodeling
  - Vapor phase processes
  - Adsorption
  - Soil treatment and soil washing
  - In situ groundwater bioremediation
  - Physicochemical remediation and barriers
  - Regulations and disposal
- Week 11: Final exam
- Last 3 weeks: Project