

Faculty of Applied Sciences



AMCO2191 Geoenvironment

[30h+15h exercises] 4 credits

This course is not taught in 2006-2007

This course is taught in the 2nd semester

Teacher(s): Alain Holeyman
Language: French
Level: Second cycle

Aims

Provide engineering students basic notions concerning environmental problems connected with soils and groundwater

Main themes

Knowledge:

- Transport phenomena of solute and non aqueous contaminants in the soil and groundwater, under saturated and unsaturated conditions
- Remediation process and technologies; landfill design considerations

Know-how:

- Integrate basic engineering disciplines (soil mechanics, transport in porous media, physics and chemistry) to analyze transport and fate of pollutants in soil and groundwater
- Assess feasibility and select best available method to limit impact of contaminating source and to remediate affected subsurface media (soil and groundwater)

Content and teaching methods

Part A (2 ECTS): Principles of transport phenomena in soils

- Introduction: historical background, geotechnical environmental engineering.
- Transport of solute contaminants: constitutive equations, advection, diffusion, hydrodynamical dispersion, adsorption et retardation, degradation, advection-dispersion equation, laboratory and field tests for characterization.
- Transport of pollutants in the non saturated soil phases: basic principles (capillarity, retention, relative permeability), migration of light and dense non aqueous phase liquids.

Part B (2 ECTS): Remediation processes and technologies

- Introduction: regulations, source et nature of contaminants.
- Source control (excavation, isolation, hydrodynamic confinement, Landfilling)
- Physio-chemical and biological methods : in-situ, on-site et ex-situ (pump and treat, soil vapor extraction, in-situ bio-remediation, combination of methods)

Lectures are delivered in auditoria while exercises are administered in seminars. Part B features case histories to illustrate the application of remediation techniques.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisite : AUCE 1173, Transport phenomena