ENV-200

Environmental chemistry

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Cursus	Sem.	Type
Environmental Sciences and Engineering	BA4	Obl.
HES - SIE	E	Obl.
Mineur STAS Russie	E	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	Written
Workload	150h
Weeks	14
Hours	**4 weekly**
Lecture	3 weekly
Exercises	1 weekly
Number of positions	

Summary

This course provides students with an overview over the basics of environmental chemistry. This includes the chemistry of natural systems, as well as the fate of anthropogenic chemicals in natural systems. It enables students to apply general chemical concepts to natural systems.

Content

- Introduction to environmental chemistry
- Chemical composition of natural water
- Biogeochemical cycles of organic and inorganic pollutants
- Fate and transformation of organic and inorganic pollutants
- Impact of pollutants on ecosystems
- Engineering applications of environmental chemistry
- Case studies

Keywords

carbonate system, alkalinity, partitioning, photochemisty, redox, speciation

Learning Prerequisites

Required courses

General chemistry

Recommended courses

Biochemistry

Learning Outcomes

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

- Estimate pH of natural waters
- Compute alkalinity in natural and engineered systems
- Analyze partitioning behavior of organic pollutants
- Compute a pollutant's photolysis kinetics
- Formulate chemical transformation kinetics

- Analyze metal speciation
- Formulate redox reactions for inorganic species

Teaching methods

Lecture ex cathedra, exercises

Expected student activities

participation in homework sessions

Assessment methods

33 % midterm exam during the semester, 67 % exam during exam session

Resources

Bibliography

- Benjamin: Water Chemistry, McGraw Hill, 2002
- Sigg, Behra, Stumm : Chimie des milieux aquatiques, Dunod, 2006
- Bliefert, Perraud: Chimie de l'environnement, Boeck ed., 2004;
- Schwarzenbach, Gschwend, Imboden : Environmental Organic Chemistry, 2nd Edition, Wiley, 2003.

Ressources en bibliothèque

- Water Chemistry / Benjamin
- Chimie de l'environnement / Bliefert
- Chimie des milieux aquatiques / Sigg
- Environmental Organic Chemistry / Schwarzenbach

Notes/Handbook

provided weekly via moodle

Moodle Link

- http://moodle.epfl.ch/course/view.php?id=2521

Prerequisite for

Pollutants analysis in the environment, Ecotoxicology, Fate and behaviour of organic pollutants