

ENV-200

**Environmental chemistry**

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<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Environmental Sciences and Engineering	BA3	Obl.
HES - SIE	H	Obl.
Mineur STAS Russie	H	Opt.

Language of teaching	English
Credits	5
Session	Winter
Semester	Fall
Exam	Written
Workload	150h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Courses	3 weekly
Exercises	1 weekly
<b>Number of positions</b>	

**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, photochemistry, 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

40 % midterm exam during the semester, 60 % exam during exam session  
Midterm exam on 4th November 2019.

### 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