



Valid as from the academic year 2016-2017

Environmental Chemistry (O000101)

Course size (nominal values; actual values may depend on programme)

Credits 5.0 **Study time** 150 h **Contact hrs** 60.0 h

Course offerings and teaching methods in academic year 2016-2017

A (semester 1)	guided self-study	10.0 h
	lecture	30.0 h
	practicum	20.0 h

Lecturers in academic year 2016-2017

Heynderickx, Philippe LA07 lecturer-in-charge

Offered in the following programmes in 2016-2017

	crdts	offering
Bachelor of Science in Environmental Technology	5	A

Teaching languages

English

Keywords

Pollutants, Soil, Air, Water

Position of the course

Relying on knowledge acquired in general and organic chemistry elements from soil chemistry, aquatic chemistry and atmospheric chemistry are combined in a quantitative treatment of chemical processes, equilibria and reaction dynamics in the environment. The source, nature and properties of organic and inorganic contaminants are reviewed and applied in the study of their behaviour in air, water, soil and ground water, and of their disrupting effects and eventual measures. Next to chemical equilibria in general and biochemical cycles, the quality of drinking water and the corresponding evaluation methods deserve attention.

Contents

- Introduction
- Chemical equilibria and reaction kinetics in soil and water
- Equilibria in solid, liquid and gas phases
- Carbonate equilibria
- Hydrated oxides of iron, sulfides
- Complexation reactions
- Role of kinetics in environmental biogeochemistry
- Chemical pollutants: source, behaviour, disrupting effects and measures
- The distribution of compounds in different environmental compartments
- Henry's Law constant, octanol-water partition coefficient and applications
- Halogenated solvents and ground water pollution, trihalomethanes in drinking water
- CFCs and breakdown of the ozone layer
- VOCs and problems of tropospheric ozone formation
- PCBs and dioxines, polycyclic aromatic hydrocarbons
- Acid deposition
- Phosphates and nitrogen: eutrophication
- Fluorine, cyanides, cadmium, mercury, lead, arsenic, chromium
- Trace metals in soils and sediments
- Adsorption/desorption; precipitation/dissolution, complex formation

Initial competences

General inorganic and organic chemistry.

Final competences

Knowledge and insight in environmental chemistry, in particular chemical processes and disruption by inorganic and organic pollutants.
Knowledge of analysis methods in verification of quality standards for (drinking) water.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, lecture, practicum

Learning materials and price

Syllabus 'Environmental Chemistry' by Prof. Dr. ir. Philippe M. Heynderickx.

References

Environmental organic chemistry/ Schwarzenbach R.P., Gschwend P.M. and Imboden D.M. ISBN 0-471-35750-2.

Syllabus 'Environmental Chemistry' by Prof. Dr. ir. Philippe M. Heynderickx and the references within.

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Participation, job performance assessment, report

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Calculation of the examination mark

Written examination with open questions: theory (closed book: 40%) and exercises (open book: 25%)

Participation + performance assessment (10%)

Lab report (25%)