

Metals and Metalloids in Environment and Technology (I002749)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size	<i>(nominal values; actual values may depend on programme)</i>		
Credits 6.0	Study time 180 h	Contact hrs	60.0 h

Course offerings and teaching methods in academic year 2022-2023

A (semester 1)	English	Gent	lecture	31.25 h
			practicum	25.0 h
			group work	1.25 h
			microteaching	2.5 h

Lecturers in academic year 2022-2023

Tack, Filip	LA24	lecturer-in-charge
De Schamphelaere, Karel	LA22	co-lecturer
Du Laing, Gijs	LA24	co-lecturer
Meers, Erik	LA24	co-lecturer

Offered in the following programmes in 2022-2023

	crdts	offering
Master of Science in Environmental Science and Technology	6	A
Master of Science in Bioscience Engineering: Environmental Technology	6	A
International Master of Science in Sustainable and Innovative Natural Resource Management	6	A
Exchange Programme in Bioscience Engineering: Chemistry and Bioprocess Technology (master's level)	6	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	6	A

Teaching languages

English

Keywords

Metals, trace elements, metalloids, environmental chemistry, soil, water, remediation, bioavailability, ecotoxicity, risk assessment

Position of the course

This is a specializing course focusing on the occurrence, geochemical behaviour, human uses and related environmental issues of metals and metalloids in environment and technology.

Contents

1. Heavy metals and metalloids: environmental chemistry, general principles and processes
2. Assessment of baseline concentrations in soils – legislation
3. Soil-plant relationship
4. Ecotoxicology, bioavailability and risk assessment of metals and metalloids in the environment
4. Physicochemical remediation techniques for metal-polluted water, sediments and soil
5. In situ management of heavy metals and metalloids in floodplains and river sediments
6. Phytomanagement
7. Environmental effects of mining activities and sustainable management of metal resources

Initial competences

- 1 Knowledge of general chemistry and analytical chemistry
- 2 Basic knowledge of environmental aquatic science
- 3 Basic knowledge of soil science

Final competences

- 1 Have insight in the nature and importance of metals and metalloids in environment and society
- 2 Understand chemical forms of occurrence and importance on the physico-chemical behaviour and ecotoxicity of metals and metalloids in the environment
- 3 Understand the meaning of background concentrations and the reasoning behind derivation of legal environmental standards
- 4 Understand interactions between metals and plants and the active role of plants in establishing homeostasis
- 5 Have insight in mechanisms determining bioavailability and ecotoxicity of metals and compute bioavailability based environmental risk and environmental criteria
- 6 Be capable of selecting and applying suitable remediation and containment approaches for metal contaminated soils, sediments and water
- 7 Have insight in the potential negative effects of high concentrations of metals and metalloids on the environment and on humans

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

Group work, lecture, microteaching, practicum

Extra information on the teaching methods

Group Work: 10
Lecture: 30
Microteaching: 6
Practicum: 24

Learning materials and price

Elaborated slides and selected scientific publications as background reading, made available through the electronic learning platform.

References

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Course content-related study coaching

Professors and staff members of the department are available (upon appointment).

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

Written examination with open questions

Examination methods in case of permanent evaluation

Assignment, peer assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Calculation of the examination mark

Permanente evaluatie: 5/20
Periodegebonden evaluatie: 15/20
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.