

Soil Remediation (I002404)

Course size (nominal values; actual values may depend on programme)
Credits 5.0 Study time 150 h Contact hrs 40.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 1)	English	group work	7.5 h
		seminar: coached	3.75 h
		exercises	
		lecture	26.25 h
B (semester 1)		microteaching	2.5 h
		group work	7.5 h
		microteaching	2.5 h
		lecture	15.0 h

Lecturers in academic year 2019-2020

Tack, Filip	LA24	lecturer-in-charge
Cornelis, Wim	LA20	co-lecturer

Offered in the following programmes in 2019-2020

	crdts	offering
Bachelor of Science in Environmental Technology	5	A
International Master of Science in Environmental Technology and Engineering	5	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	3	B

Teaching languages

English

Keywords

Remediation, heavy metals, organic and inorganic contaminants, transport of water, transport of pollutants

Position of the course

This course aims at providing a thorough knowledge and insight in concepts applied for the remediation of contaminated soils. Students should become aware of the possibilities and limitations associated with different conceptual approaches. They should be able to draw, in general terms, a concept of a proposal for a remediation program from site assessment to remediation. Part A (3 ECTS, which can be taken as a separate course), deals with soil remediation approaches. In Part B (2 ECTS), focus goes to the transport of contaminants as governed by soil physical properties, water flow and the properties of the pollutant.

Contents

A. Soil contamination and remediation (3 ECTS, also can be taken as a separate course)

1. Introduction
2. Pollution behaviour
3. Site characterisation
4. Soil remediation technologies
 - 4.1. In situ versus on site and ex situ methods
 - 4.2. Biological treatment technologies
 - 4.3. Chemical treatment technologies
 - 4.4. Physical treatment technologies
 - 4.5. Solidification and stabilisation technologies

- 4.6. Thermal treatment technologies
- B. Water and chemical transport in soils
 1. Composite soil properties
 2. Properties of water related to porous media
 3. Soil-water content
 4. Energy status of water in soil
 5. Water retention curve
 6. Water flow in capillary tubes
 7. Water flow in saturated soil
 8. Water flow in unsaturated soil
 9. Chemical flow: conservation and flux equations

Initial competences

General basic knowledge in inorganic and organic chemistry and physics

Final competences

- 1 The student has acquired a thorough knowledge and insight in concepts applied for the remediation of contaminated soils.
- 2 Have an insight in the possibilities and limitations associated with different conceptual approaches for remediation of land
- 3 Able to draw, in general terms, a concept of a proposal for a remediation program from site assessment to remediation.
- 4 Analyse simple to more complex water transport processes in soil.
- 5 Apply standard methods to determine physical and hydrophysical soil properties.

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, seminar: coached exercises

Extra information on the teaching methods

Group work: students study a contamination case and elaborate a proposal for remediation of that site. This proposal is presented and discussed during a seminar.
Seminar: coached exercises: calculations are solved classically using a pocket calculator + computer model simulations (with laptop computer)

Learning materials and price

For part A and B, a syllabus is available (8 and 5 euro, respectively).
Slides are electronically available on the learning platform.

References

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Course content-related study coaching

Questioning (during and after the lecture); besides the lecturer an assistant is also on stand-by for questions and additional explanations concerning the theoretical classes and practical exercises

Evaluation methods

end-of-term evaluation and continuous assessment

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

Oral examination

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

Oral examination

Examination methods in case of permanent evaluation

Assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Calculation of the examination mark

Part A: 2/3 of total

- group work and microteaching: 40%
- oral examination: 60%

Part B: 1/3 of total

- assignment
- written exam

Students that fail one of the parts may be declared failed for the course, and accordingly receive a score of no more than 9/20