

## Environmental Soil Science (O000110)

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

Credits	5.0	Study time	150 h	Contact hrs	60.0 h
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Course offerings and teaching methods in academic year 2019-2020

A (semester 2)	English	seminar	23.75 h
		microteaching	6.25 h
		guided self-study	7.5 h
		lecture	22.5 h

Lecturers in academic year 2019-2020

Tack, Filip	LA24	lecturer-in-charge
De Neve, Stefaan	LA20	co-lecturer

Offered in the following programmes in 2019-2020

<a href="#">Bachelor of Science in Environmental Technology</a>	crdts	offering
	5	A

Teaching languages

English

Keywords

*Soils, soil characteristics, soil processes, soil reactions, soil-water relationships, environment, plant growth, ecosystem, soil fertility, soil contamination*

Position of the course

*This course aims to deliver relevant knowledge about the soil for students in environmental sciences. Basic concepts of the physical and chemical nature and properties of soils are introduced. Plant nutrients, contaminants and their interaction with soil and plants are studied.*

Contents

- A. General Soil Science
  1. Functions of soils
  2. Weathering and parent materials
  3. Soil genesis
  4. Clay mineralogy: structure, origin, importance
  5. Organic matter: origin, composition, evolution, determination
  6. Colloidal soil properties
  7. Soil reaction
  8. Physical soil properties: granulometry and soil texture, soil structure, soil colour, soil temperature
  9. Introduction to soil classification
  
- B. Soil contamination and soil fertility
  1. Chemical composition of soils
  2. Fate and pathway of soil nutrients
  3. Soil contamination and remediation
  4. Trace elements in soils
  5. Soil-plant relationships
  6. Chemical analysis of soils and plants

Initial competences

General knowledge of chemistry, general analytical chemistry and physics.

Final competences

1. Ability to read and interpret soil reports, tables with soil analytical data and soil maps.

- 2 Ability to recognize the activity of pedogenetic processes by morphological observational evidence.
- 3 Apply standard methods to determine physical, hydrophysical and chemical soil properties.
- 4 Understanding of basic chemical and physical processes in normal soils and alterations caused by pollution.
- 5 Be able to interpret physical and chemical soil analysis in the context of soil quality, soil functioning and soil use.

#### Conditions for credit contract

Access to this course unit via a credit contract is unrestricted: the student takes into consideration the conditions mentioned in 'Starting Competences'

#### Conditions for exam contract

This course unit cannot be taken via an exam contract

#### Teaching methods

Guided self-study, lecture, microteaching, seminar

#### Extra information on the teaching methods

The part "A. General Soil Science" is by distance learning. There is a general lecture of about 2 hrs through video conferencing. Students then have to study the provided materials (guided self study). The material is discussed interactively during contact moments (microteaching: 6 hrs). Exercises are solved under guidance (4 hr work seminar).

Part B "B. Soil contamination and soil fertility" involves 20 hours of classical teaching. During the work seminars, cases on environmental soil issues are worked out. An important part is also dedicated to studying analytical methods involved in soil analysis

#### Learning materials and price

Electronic version of the slides

#### References

Brady N.C. 1990. The nature and properties of soils. 10th Edition, MacMillan Publishing Company, New York.

Sparks D.L. 2003. Environmental Soil Chemistry. Academic Press, Elsevier Science, 203 pp.

de Haan, F.A.M. and M.I. Visser - Reyneveld (Editors), 1996. Soil Pollution and Soil Protection, PHLO Wageningen Agricultural University

Jury, W.A. and Horton, R. 2004. Soil Physics. John Wiley & Sons.

#### Course content-related study coaching

Interactive support via Minerva, by e-mail or in person.

#### 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, report

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

Written examination with open questions

#### Examination methods in case of permanent evaluation

Report

#### Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

#### Calculation of the examination mark

33% of the score is determined by evaluation of part A, 66% of the score is determined by evaluation of part B. Of this part, 1/4th is determined through permanent evaluation.