

COURSE GUIDE

# Soil Quality

SBL-21806



Terra Preta (7 % SOM; pH 6)



Oxisol (2 % SOM; pH 5)

Soil Biology Group

<https://www.wur.nl/en/Research-Results/Chair-groups/Environmental-Sciences/Soil-Biology-Group.htm>



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## **Soil Quality** (SBL-21806)

Acronym:	SQ
Contributing science groups:	Soil chemistry (SOC) Soil biology (SBL)
Language of instruction:	English
Study load / Credit points:	6 ects
Components:	Lectures 24 hrs (3 ects) Tutorials 12 hrs (1 ects) Practical 40 hrs (2 ects)
Period/time:	period 5 (March, April) Morning (8:20 – 11.40 [sometimes 13.30] hrs)
Contact person:	prof. dr. T.W. Kuyper <a href="mailto:thom.kuyper@wur.nl">thom.kuyper@wur.nl</a>
Lecturers:	prof. dr. T.W. Kuyper dr. G.F. Koopmans
Examiner:	prof. dr. T.W. Kuyper
Examination:	Written exam (60%) Report on practical (40%)
Type of exam:	Open book. You are allowed to bring with you: reader, practical manual, lecture notes made by you, tutorial notes and powerpoints of the lectures.
Assumed knowledge:	Introductory-level course on ecology(e.g., PEN-10503); Introductory-level course on soil science (e.g., SOC-22803).
Continuation courses:	SBL-32806 Biological Interactions in Soil SOC-34806 Applications in Soil and Water chemistry SBL-31806 Nutrient management SBL-35306 The Carbon Dilemma SOC-36306 Biogeochemical Cycles and Climate Change Mitigation

## **Profile of the course:**

The dynamics of nutrients and contaminants within the terrestrial ecosystem including the groundwater and their relationship with soil biota are explained and related to actual environmental issues such as bioavailability, soil quality assessment, sustainable agriculture, climate change, and land use change. Soil quality aspects are discussed with a focus on nature, agriculture and the environment. Actual environmental issues regarding nutrients (in surplus as well as limiting supplies) and contaminants are presented and explained. Soil quality standards are discussed in relation to chemical compound behaviour, risk assessment protocols, and fertilizer recommendations.

Every week one specific topic will be dealt with from the perspective of both soil biology and soil chemistry. These topics are:

- Soil Quality – evaluation and monitoring of soil quality
- Energy concept for Soil Quality
- Soil Quality and Heavy Metal pollution
- Soil Quality and Sustainable Agriculture
- Soil Quality and Climate Change
- Soil Quality and Land Use Change

## **Learning outcomes:**

After this course you should be able to:

- Explain the concept of biological, chemical and physical soil quality and their interrelations;
- Translate the concept of soil quality into the national and international soil policy domains;
- Discuss advantages and disadvantages of the use of various indicators of soil quality;
- Understand and apply the concept of nutrient and contaminant bio-availability and mobility;
- Execute and analyse scientific experiments on contaminant bio-availability and mobility and interpret the results in the framework of soil quality.

## **Activities:**

The lectures provide students with pertinent knowledge. In the practical, a selection of procedures and techniques used in soil chemical and biological research is demonstrated and applied. In the tutorials, hands-on exercises related to the lecture topics will be presented and discussed. Attendance at lab and computer practical is compulsory.

**Literature:** Reader Soil Quality and Practical manual Soil Quality.

**Course schedule** (first 6 weeks, plus Monday in week 7): a detailed schedule will be made available through MyPortal.

Lectures: 2 x 2 h per week

Practical: 2 x 4 h per week

Tutorial: 1 x 2 h per week.

### Assessment of learning outcomes:

Assessors: T.W. Kuyper & G.F. Koopmans

<b>Learning outcome</b>	<b>Written exam</b>	<b>Practical report</b>
Explain the concept of biological, chemical and physical soil quality and their interrelations	x	
Translate the concept of soil quality into the national and international soil policy domains	x	
Discuss advantages and disadvantages of the use of various indicators of soil quality	x	
Understand and apply the concept of nutrient and contaminant bio-availability and mobility	x	x
Execute and analyse scientific experiments on contaminant bio-availability and mobility and interpret the results in the framework of soil quality		x
<b>Contribution to final mark</b>	<b>60%</b>	<b>40%</b>

Minimum requirement for written exam and practical report separately is  $\geq 5.0$ ; together minimum requirement is  $\geq 5.5$ .

Results of partial interim examinations stay valid for a time period of 5 years.