

## Basic and Applied Freshwater Ecology (I002537)

Course size (nominal values; actual values may depend on programme)  
 Credits 5.0 Study time 150 h Contact hrs 50.0 h

### Course offerings and teaching methods in academic year 2019-2020

Offering	Language	Teaching Method	Hours
A (semester 1)	English	lecture	25.0 h
		seminar: coached	5.0 h
		exercises	
		guided self-study	10.0 h
		excursion	5.0 h
		lecture: plenary exercises	5.0 h

### Lecturers in academic year 2019-2020

Goethals, Peter LA22 lecturer-in-charge

### Offered in the following programmes in 2019-2020

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

### Teaching languages

English

### Keywords

Fundamental ecology, freshwater, clusters, interactions, ecosystem types, communities, ecological processes, exploitation, disturbance, protection, rivers, lakes, ponds, wetlands

### Position of the course

This course offers basic and general insights in the composition and functioning of freshwater systems, in both natural as (over)exploited systems. After an overview about fundamental aspects of (freshwater)ecology, the students receive knowledge about rivers, lakes, ponds and wetlands, and are supposed to be able to analyze systems in the field concerning main components and processes, as well as the dynamic behavior of the system.

### Contents

THEORY (With insight questions for stimulating the interaction): 40h

#### **Basic (freshwater) ecology (20h, waarvan 10h begeleide zelfstudie)**

Ecological clusters and interactions

Ecological cyclez

Types of (aquatic) ecosystems

Ecological dynamics

Spatial distribution of (aquatic) ecosystems and their interactions

#### **Applied freshwater ecology (20h)**

Key freshwater systems: an overview of rivers, lakes, ponds and wetlands

Hydrology, hydraulics and hydromorphology in relation to composition and behavior of freshwater systems

The specific (bio)chemical key processes of rivers, lakes, ponds and wetlands

The biology of freshwater ecosystems: an overview of the diverse communities and their traits

Energy flows and storage in freshwater ecosystems

Ecstoichiometry of freshwater ecosystems

Migration in and between freshwater ecosystems

Invasion-ecology: key processes and impacts

Ecological interactions and food webs, with an emphasis on competition and predation

Behavior of freshwater ecosystems: dynamics and spatial heterogeneity

Exploitation of freshwater ecosystems: combination, optimization, overexploitation and protection

GUIDED PRACTICAL EXERCICES: 5h

During two sessions, the students get in contact with international river systems

(Mekong, Amazon, Nile, ...),

large lakes (Victoria, Tonle Sap, ...), as well as Flemish water systems such as The Scheldt and large

stagnant waters. The objective of these guided questions is to make students familiar with the application of

the theory concerning wastewater discharges, nutrient enrichment, invasions and hydropower. After a short

introduction of the systems and explaining the questions, the student can individually prepare answers, that

serve as a basis for a plenary discussion to solve the questions.

EXCURSION: 5h

During the field excursion, several freshwater ecosystems are visited and discussed.

The objective of these

visits and discussions is to prepare students via insight questions for the exam. In particular the identification

of components and processes is trained during the excursion.

#### Initial competences

Fundamental knowledge about biology, for instance obtained via The Living World 1, 2 and 3.

The student can define, explain and identify key-processes and concepts of biological systems

#### Final competences

- 1 The student is able to define and use different types of classifications of ecosystem components (clusters), as well as present their interactions.
- 2 The student is able to provide an overview of different types of ecosystems, their main cycles, as well as the dynamics and spatial distribution.
- 3 The student can define and explain key terminology and concepts of freshwater ecosystems, and is able to identify these.
- 4 The student is able to systematically analyze freshwater ecosystems concerning the composition and major processes, as well as how both are affected by human activities.
- 5 The student is able to optimize or protect freshwater ecosystems in function of the desired exploitation, such as drinking water production, fisheries, aquaculture, wastewater treatment, ...
- 6 The student can develop and defend a vision in a discussion related to the exploitation and/or disturbance of a particular freshwater ecosystem (pool, wetland, lake or river)
- 7 The student is able to identify the major components and processes of freshwater ecosystems in the field (or in pictures and videos), and can explain the functioning as well as the major disturbances.

#### 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, excursion, lecture, lecture: plenary exercises, seminar: coached exercises

#### Learning materials and price

All materials are available via digital learning environment (slides with text of the theory classes, as well as additional publications of the web of science)

#### References

Diverse academic books and publications

#### Course content-related study coaching

#### Evaluation methods

end-of-term evaluation

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

Written examination

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

Written examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

Written examination, consisting of concise knowledge related questions, summarizing text of part of the course, insight questions and application questions.

Calculation of the examination mark

The score is merely calculated on the basis of the written exam

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.