

## Applied Freshwater Ecology (I002504)

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

**Credits 3.0**

**Study time 90 h**

**Course offerings and teaching methods in academic year 2024-2025**

A (semester 1)

English

Gent

seminar

excursion

lecture

**Lecturers in academic year 2024-2025**

Goethals, Peter

LA22

lecturer-in-charge

**Offered in the following programmes in 2024-2025**

**crdts**

**offering**

[Bachelor of Science in Bioscience Engineering](#)

3

A

[Bachelor of Science in Environmental Technology](#)

3

A

[Master of Science in Aquaculture](#)

3

A

[Master of Science in Environmental Science and Technology](#)

3

A

[Exchange Programme in Bioscience Engineering: Agricultural Sciences \(master's level\)](#)

3

A

[Exchange Programme in Bioscience Engineering: Environmental Technology \(master's level\)](#)

3

A

[Exchange Programme in Bioscience Engineering: Land and Forest management \(master's level\)](#)

3

A

**Teaching languages**

English

**Keywords**

freshwater, communities, ecological processes, exploitation, disturbance, protection, rivers, lakes, ponds, wetlands

**Position of the course**

This course offers general insights in the composition and functioning of freshwater systems, in both natural as (over)exploited systems. 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): 20 h

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

Ecotoxicology 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 EXERCISES: 5 h**

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, especially concerning the effects of 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: 5 h** 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**

Basic ecological knowledge concerning components and processes of ecosystems: the student can define, explain and identify key-processes and concepts of ecosystems

#### **Final competences**

- 1 Define and explain key terminology and concepts of freshwater ecosystems
- 2 Systematically analyze freshwater ecosystems concerning the composition and major processes
- 3 Optimize the exploitation of freshwater ecosystems (drinking water production, fisheries, aquaculture, wastewater treatment, ...) in a context of sustainability
- 4 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)
- 5 Identify the major components and processes of natural and exploited freshwater ecosystems in the field (or in pictures and videos)

#### **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**

Seminar, Excursion, Lecture

#### **Study material**

None

#### **References**

Diverse academic books and publications

#### **Course content-related study coaching**

#### **Assessment moments**

end-of-term assessment

#### **Examination methods in case of periodic assessment during the first examination period**

Written assessment

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

Written assessment

#### **Examination methods in case of permanent assessment**

#### **Possibilities of retake in case of permanent assessment**

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.