Course Specifications
Valid as from the academic year 2017-2018

Environmental Ecology (I001349)

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
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<tbody>
<tr>
<td>7.0</td>
<td>202 h</td>
<td>90.0 h</td>
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Course offerings and teaching methods in academic year 2018-2019

A (semester 1) English
practicum 20.0 h
excursion 25.0 h
lecture 45.0 h

Lecturers in academic year 2018-2019

Goethals, Peter LA22 lecturer-in-charge
Janssen, Colin LA22 co-lecturer
Verbeeck, Hans LA20 co-lecturer

Offered in the following programmes in 2018-2019

<table>
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<tr>
<th>crdts</th>
<th>offering</th>
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<td>7</td>
<td>A</td>
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</tbody>
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Master of Science in Environmental Sanitation
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)

Teaching languages
English

Keywords
Freshwater ecology, aquatic ecology, limnology, hydrobiology, materials budget, marine ecology, oceanography, systematics, pelagic environment, benthic environment, productivity, zonation, terrestrial ecology, ecosystem characteristics, plant-environment interactions, carbon budget, water budget, energy budget, antropogenic impact, experimental set-up

Position of the course

Part 1: Freshwater ecology
This introductory course aims at providing the students with the basic knowledge of the structure and the functioning of freshwater ecosystems. The abiotic (physical and chemical) characteristics of lakes and rivers, as well as the qualitative and quantitative composition of the different biological communities are reviewed. Major attention is paid to the materials budget of the inland waters and on the interactions between the living and non-living components. The practical training includes qualitative and quantitative microscopic analysis of the major biological communities living in freshwater ecosystems (phyto- and zooplankton, periphyton, macrobenthos).

Part 2: Marine ecology
This course aims at describing and illustrating the fundamental concepts and general processes governing marine ecosystems. In the theoretical course, the interactions between the abiotic factors and the structure and function of marine ecosystems are reviewed in detail. The practicals on the other hand are focussing on the systematics and auto- and synecology of the different groups of marine organisms. The practical exercises are supported by field excursions and case studies. The integration of the theoretical and practical aspects of marine ecology give the student an in-depth, experience-oriented knowledge of this scientific field.

Part 3: Terrestrial ecology
The course discusses exchange processes between living organisms (mainly plants) and their terrestrial environment. The main terrestrial ecosystems and their characteristics are reviewed. Special attention is paid to plant-radiation interactions and the micro-climates in vegetations and soils. The carbon, water and energy budgets of

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ecosystems are discussed in detail. Actual antropogenic impact on terrestrial ecosystems (e.g. climatic change, disturbance) are also focussed on.

Contents

**Part 1: Freshwater ecology**
1. Distribution, age and genesis of inland waters
2. Structure and physical properties of water
3. Physical relationships in natural water bodies
   3.1. Radiation climate
   3.2. Heat balance of water bodies
   3.3. Water movement and exchange in natural waters
4. Chemical properties of water
   4.1. Dissolved gases and solids
   4.2. Organic solutes in natural waters
5. Associations of living organisms in inland waters
   5.1. Lakes, ponds, bogs
   5.2. Flowing waters
6. Materials budget of inland waters
   6.1. Production
   6.2. Consumption
   6.3. Destruction and the role of bacteria
   6.4. Materials transport and energy flux in aquatic ecosystems

**Part 2: Marine ecology**
1. General characteristics of the marine environment
2. Zonations in the marine environment
3. Physical factors
4. Chemical factors
5. Systematics of marine organisms
6. Ecology of pelagic communities
7. Ecology of benthic communities
8. Synecology of the benthos
9. Productivity of marine systems
10. Exploitation of marine systems - fisheries and aquaculture

**Part 3: Terrestrial ecology**
1. Introduction
2. Overview of terrestrial ecosystems
3. Physical environment of terrestrial ecosystems
4. Carbon budget of terrestrial ecosystems
5. Water budget of terrestrial ecosystems
7. Antropogenic impacts on ecosystems (e.g. energy and climate issues, carbon management,...)

Initial competences
General biology, general ecology

Final competences
1 Understanding the main theoretical processes driving ecosystem dynamics in aquatic and terrestrial ecosystems.
2 Based on the theoretical knowledge the student should be able to estimate possible consequences of human interactions in the different aquatic ecosystems of the world.
3 Based on the theoretical knowledge the student should be able to estimate possible consequences of human interactions in the different terrestrial ecosystems of the world.

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
Excursion, lecture, practicum

Learning materials and price
Part 1: Freshwater ecology handbook (see ref.1) and syllabus available
Part 2: Marine ecology syllabus available; for recommended literature see references
Part 3: Terrestrial ecology syllabus available

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Cost: 25 EUR

References

Part 1: Freshwater ecology

Part 2: Marine ecology
R. Barnes, Invertebrate Zoology, Saunders College Publishing (1986)

Part 3: Terrestrial ecology

Course content-related study coaching
Oral presentations, discussions in groups (of different sizes), forums in Minerva, guided excercises, contact hours for individual guidance upon request

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, written examination with multiple choice questions

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions, written examination with multiple choice questions

Examination methods in case of permanent evaluation
Assignment, report

Possibilities of retake in case of permanent evaluation
examination during the second examination period is possible in modified form

Calculation of the examination mark
Each part contributes for 33.3% of the total score. The examinator can give a fail mark to students who eschew period or not period related evaluations.

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