Ecosystem Based Adaptation to Global Change

2025 - 2026

Is part of the next programmes:

- M0037000 Master of Science in Marine and Lacustrine Science and Management

- M0047002 Master of Biology: Global Change Biology

- U0001008 Courses open to exchange students in Sciences

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Course Code:	2010WETOLA
Study Domain:	Biology
Semester:	1E/2E SEM
Contact Hours:	30
Credits:	6
Study Load (hours):	168
Contract Restrictions:	Exam contract not possible

Language of Instructions:	ENG
Lecturer(s):	T Stijn Temmerman C Matteo Campioli C Jan Staes
Examperiod:	exam in the 2nd semester

1. Prerequisites *

speaking and writing of:

- English

reading and comprehending of:

- English

general notion of the basic concepts of

Before starting this course, the student should have a basic knowledge of ecology, geology, and physics on Bachelor level.

2. Learning outcomes *

- Students understand how different ecosystem types can contribute to the mitigation of impacts or risks induced by climate change, including sea level rise, increasing frequency and intensity of storms, floods, droughts, risks for erosion.
- Students have insights in recent research results on ecosystem-based mitigation and adaptation options to global change.
- Students have knowledge of real-life implementations of programs for risk mitigation and adaptation based on nature based solutions.

3. Course contents *

This course gives an overview of the hazards to ecosystems and to human society that are related to global change, and how these hazards can be mitigated by ecosystem-based adaptation and mitigation. This is discussed for forest ecosystems and water-related ecosystems, with case studies along the continuum from upland wetlands and lakes, moving downstream to fluvial rivers, floodplains, tidal rivers and estuaries, up to coastal zones.
The hazards that are discussed include changes in precipitation leading to flood and drought risks, forest fires, anthropogenic nutrient loads leading eutrophication risks, land use changes leading to habitat loss and related loss of ecosystem services, coastal and estuarine hazards including sea level rise, increasing frequency and intensity of storm surges, shoreline erosion risks, etc. We will inroduce the main mechanisms behind these hazards, their global geographical occurrence, and their consequences for human societies and ecosystems. This will be illustrated with case studies.
The concept of mitigation of and adaptation to hazards by ecosystems will be introduced. Emphasis will be put on the role of ecosystems – such as upland wetlands, floodplains, tidal marshes, mangroves, dunes, coral reefs.... – on (1) adaptation to the hazards discussed above (e.g. the contribution of river floodplains, tidal marshes and mangroves in the attenuation of flood waves and flood risks; role of wetlands to buffer flood and drought risks, and to remediate against eutrofication risks, etc.); and (2) mitigation of global climate change (e.g. contribution of wetlands etc. to carbon sequestration). Case studies and examples will be discussed based on recent literature.

This course runs over the 1st and 2nd semester (i.e. a so-called year-course).

The format of this course will consist of theory lectures in the 1st semester. In the 2nd semester, the students will apply the concepts to specific case studies during seminar work.

4. International dimension *

- This course stimulates international and intercultural competences.
- Students use course materials in a foreign language.
- Students give presentations in a foreign language.

- Students compare the course contents in an international context.
- Students work together (online) with international students.

5. Teaching method and planned learning activities

5.1 Used teaching methods *

Class contact teaching

- Lectures
- Seminars/Tutorials

Personal work

Assignments

- In group

Paper

- In group

5.2 Planned learning activities and teaching methods

The first semester will consist of theoretical lectures, giving an overview of the factors contributing to global change, the hazards it implies to ecosystems and human society, and how ecosystem-based approaches can contrbute to mitigate the causes and consequences of global changes.

The second semester will be devoted to seminar work. The students will work in groups on specific topics. Based on an extensive literature study, they will develop cases of ecosystem-based approaches to global change adaptation and mitigation, for different contexts and ecosystem types. The cases will be worked out into a paper and oral presentations and discussions with the full class group.

5.3 Facilities for working students *

Classroom activities

- Lectures: recording available via video link on Blackboard

6. Assessment method and criteria *

6.1 Used assessment methods *

Examination

- Written examination without oral presentation
- - Closed book
- - Open-question

Continuous assessment

- Assignments (no second assessment period)

Other assessment methods

- Written assignment (no second assessment period)
- Presentation (no second assessment period)

6.2 Assessment criteria *

This course is evaluated as follows:
(1) 50% of the final score is based on evaluation of the seminar work during the 2nd semester. As will be explained in detail during the seminar work, it's evaluation will be based on the evaluation of:
-the choice of the 3 proposed case studies and the list of articles for the selected one (5%)
-the first version of the paper (7.5%)
-the final version of the paper (7.5%)
-the first version of the powerpoint presentation (15%)
-the oral presentation in front of the class group (15%)

(2) 50% of the final score is based on the written exam. The study material for the exam consists of the (i) the content of the theory classes (semester 1) and (ii) the content of the oral presentations given by the students (semester 2).

7. Study material

7.1 Required reading *

The study material consists of a combination of course notes and powerpoint slides, provided by the lecturers, and a collection of recent research articles. The study material will be provided through the Blackboard online teaching platform.

7.2 Optional reading

The following study material can be studied voluntarily :

In addition, optional study material will be provided in the form of references to scientific studies, articles, and/or text books.

8. Contact information *

The three profs. for this course can be contacted through email:
stijn.temmerman@uantwerpen.be
matteo.campioli@uantwerpen.be
jan.staes@uantwerpen.be

9. Tutoring

The students can ask questions to the teachers about the lectures. For the seminar work, there will be specific instructions on the tutoring.