GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2020-2021

Ecosystem Dynamics (C003322)

Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

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

Credits	Study time	Contact hrs
5.0	150 h	50.0 h

Course offerings and teaching methods in academic year 2020-2021

A (semester 1)	English	Gent	seminar	7.5 h
			self-reliant study activities	10.0 h
			lecture	20.0 h
			guided self-study	5.0 h
			online lecture	0.0 h
			online seminar	0.0 h

Lecturers in academic year 2020-2021

Verleyen, Elie	WE11	lecturer-in-charge
Verschuren, Dirk	WE11	co-lecturer
Vyverman, Wim	WE11	co-lecturer

Offered in the following programmes in 2020-2021	crdts	offering
Master of Science in Teaching in Science and Technology (main subject Biology)	5	A
Master of Science in Biology	5	A
Exchange Programme in Biology (master's level)	5	A

Teaching languages

English

Keywords

paleoecology, biogeography, migration, extinction, speciation, tectonics, glacial-interglacial cycles, succession, disturbance, alternative stable states, global change, climate optima, invasive species

Position of the course

This course is organized within the framework of the major Global Change Ecology (Master in Biology) and builds on the competences and knowledge obtained within the courses ‘Ecology (1Ba)’, ‘Biogeography (2Ba)’ and ‘Community and Systems Ecology (3Ba)’. Students will obtain a thorough understanding of the nature of long-term and short-term processes and their effect on population cycles, the structure and functioning of ecosystems, the distribution of biota and the biotic components of biogeochemical cycles. The role of long-term processes such as glacial-interglacial cycles, tectonics and climate changes in structuring biogeographic patterns, speciation and extinction and theinteraction between humans and their environment during the quaternary will be discussed. The history of the Earth’s biosphere will form the temporal framework. Short-term processes that will be dealt with are disturbance, catastrophes and global change and their effect on the succession of natural communities, and population dynamics of invasive species.

Contents

1 Temporal dynamics of ecosystems on time scale ranging from 1.10^4 to 1.10^6 years
a. Paleoecology and climate of the past, the evolution of the biosphere and biosphere-geosphere interactions since the origin of the Earth and its oxygen containing atmosphere
b. Long-term dynamics of terrestrial and marine biomes
c. The interaction between large-scale changes in ecosystems and biogeochemical

cycles
2 Temporal dynamics of ecosystems on time scales between 1.10^2 and 1.10^4 years
a. Overview of the climate, paleoecology and ecosystem dynamics during the Quaternary
b. Migration and colonization on a regional and continental scale; glacial (micro- and cryptic) refugia
c. Late Quaternary history of ecosystems in western Europe
d. The interplay between the concentration of greenhouse gasses and ecosystems during glacial-interglacial cycles
e.The interplay between humans and nature
3 Temporal dynamics of ecosystems on a time-scale between 10s to 100s of years
a. Interactions between rare disturbances, natural succession and metapopulation dynamics
b.Re-organisation of stable states

Initial competences

Passed the exams of 'Ecology (Ba1)', 'Biogeography (2Ba)' and 'Community and systems ecology (3Ba)' or obtained the relevant knowledge within similar courses

Final competences

1 Demonstrating an advanced knowledge on the causes and timing of Quaternary climate changes (natural and anthropogenic) in relation to the long-term history of the biosphere.
2 Demonstrating an advanced insight into the importance of (non-linear) temporal dynamics for ecosystem processes, the distribution and evolution of biota and the biotic components of biogeochemical cycles on time scales ranging from hours to millions of years.
3 Demonstrating an advanced knowledge on the historical interactions between humans, climate and nature.

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, lecture, seminar, self-reliant study activities, online lecture, online seminar

Extra information on the teaching methods

on campus lectures, online directed PC excercises, self-directed learning

Learning materials and price

Powerpoint slides and a selection of supporting scientific publications (available on Ufora)

References

'The Holocene: an environmental history' by Neil Roberts (Blackwell, 1998, ISBN 0-631-18638-7).
Ecosystem Dynamics: From the past to the future' by Richard H.W. Bradshaw & Martin T. Sykes (Wiley Blackwell, 2014, ISBN 978-1-1199-7077-4).

Course content-related study coaching

Individual feedback with lecturers, directed oline PC excersises with time for interaction between the student and the supervisor

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

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

Written examination with open questions

Examination methods in case of permanent evaluation

Participation, assignment, peer assessment, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

Questions regarding the knowledge and insights in the course content during the periodic exam and evaluation of the oral report for the non-periodic evaluation. Permanent evaluation during the practical courses.

Calculation of the examination mark

75% exam and 25% non-periodic evaluation