GHENT UNIVERSITY

Course Specifications

From the academic year 2021-2022 up to and including the academic year

Applied Marine Ecology (I002535)

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

Credits 3.0 **Study time 90 h** **Contact hrs** 30.0h

Course offerings and teaching methods in academic year 2022-2023

A (semester 1)	English	Gent	guided self-study	2.5h
			seminar: practical PC room classes	3.75h
			excursion	5.0h
			online lecture	10.0h
			lecture	5.0h
			fieldwork	3.75h

Lecturers in academic year 2022-2023

Janssen, Colin	LA22	lecturer-in-charge
Semmouri, Ilias	LA22	co-lecturer

Offered in the following programmes in 2022-2023	**crdts**	**offering**
Bachelor of Science in Environmental Technology	3	A
Master of Science in Aquaculture	3	A
Master of Science in Bioscience Engineering: Environmental Technology	3	A
Master of Science in Bioscience Engineering: Land, Water and Climate	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

Marine biotic and abiotic processes, Marine ecosystems, Blue growth, Ocean threats

Position of the course

This course aims at describing and illustrating the fundamental and applied concepts of marine processes and ecosystems. In the theory lectures, the interactions between biotic and abiotic processes and the structure and functions of marine ecosystems are reviewed in detail. The field excursions integrate these theoretical aspects and give the student in-depth experience-oriented knowledge. In contrast with classic marine ecology, the modern human relation with the marine environment is incorporated in this course. Both blue growth threats and opportunities from a bioscience engineering point of view are discussed

Contents

Part I - Ocean characteristics, physical-chemical processes and man

a) Planet Ocean: Introduction and terms
b) Moving Oceans: seafloor, winds and currents
c) Salty Oceans: salinity and importance
d) Deep Oceans: temperature, pressure and density
e) Dark Oceans: light and importance
f) Chemical Oceans: CO2, interactions, climate change and consequences

Part II - Ocean life processes

a) Living Ocean: origin of life, biodiversity and production
b) Primary production: species, light/depth/nutrients/growth, cycles and phenomena
c) Microbial ecology: production, decomposition, ecological context and seasonal cycles
d) Secondary production: P/B ratio, measurements and drivers

Part III - Ocean Systems

a) Rocky and sandy shores: waves, tides, environmental variables, zonation and research
b) Estuarine ecology: zones, salinity and ecological features
c) Pelagic and benthic ecosystems

Part IV – Threats and opportunities in marine systems

a) Introduction: pressures, risks and benefits, ecosystem services and blue growth
b) "Toxic" Ocean: presence and effects of chemicals, other stressors
c) "Unbalanced" Ocean: risks of eutrophications
d) "Tasty" Ocean: need for food from the oceans
e) "Healthy" Ocean: provision of known and unknown health services

Initial competences

General Biology, General Ecology, General Physics, General Chemistry

Final competences

1 Understand the specific charachteristics of the oceans and their importance for marine applications.
2 Understand the main physical-chemical and ocean life processes driving ecosystem dynamics in different marine ecosystems, and their importance for marine applications.
3 Discuss possible theoretical consequences and opportunities of/for human interactions in the different marine ecosystems.
4 Estimate in a quantitative way the consequences and opportunities of/for human interactions in the different marine ecosystems.

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

Online lecture, Guided self-study, Excursion, Lecture, Fieldwork, Seminar: practical pc room classes

Extra information on the teaching methods

The theory will be lectured online as well as on campus. The online lectures use semi-professional videos which cover all chapters, while the on campus lectures mainly cover the introduction, special topics and question and answer sessions.
The two field excursions will be organized: (1) to the rocky and sandy shores a salt marshland near Boulogne (France) and (2) a monitoring study on the Belgium part of the North Sea with the research vessel Simon Stevin. Both field exercises are a combination of applied fieldwork and lectures in the field. As such, students receive hand-on experience about the theoretical and practical content of the course. As the capacity of the research vessel Simon Stevin is limited, this field excursion is organized multiple (up to 4 times per program) times.
In the "seminar: practical PC room classes" students learn how to convert theoretical marine processes and concepts into quantitative estimations. As such, students calculate for a few different problems how anthropogenic interactions influence marine ecosystems.
Students do not have to write reports or make presentations for the field excursions and the PC classes, but participation is mandatory.
(Guided) self-study is stimulated by offering example exam questions and specific (suggested reading) publications.

Learning materials and price

Lecture presentations available via Ufora; for recommended literature see references

References

Kaiser et al., 2012, Marine ecology - Processes, Systems, and Impacts, Second Edition, Oxford University Press, 528 pages.

Course content-related study coaching

Q&A sessions at the beginning and/or end of every lecture, interaction during the lectures, discussions in groups (of different sizes), guided excursions and fieldwork, contact hours for individual guidance (upon request).

Assessment moments

end-of-term and continuous assessment

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

Written examination with multiple choice questions, Written examination with open questions

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

Written examination with multiple choice questions, Written examination with open questions

Examination methods in case of permanent assessment

Participation

Possibilities of retake in case of permanent assessment

not applicable

Calculation of the examination mark

The final examination mark is based on the periodic evaluation (i.e. the exam). Students who eschew period aligned and/or non-period aligned evaluations (i.e. participation of mandatory excursions and PC classes) may be failed by the examiner.