

# Course Specifications

Valid in the academic year 2024-2025

# Applied Marine Ecology (1002535)

Course size	(nominal values; actual values may depend on programme)				
Credits 3.0	Study time 90 h				
Course offerings and	teaching methods in academic yea	ar 2024-2025			
A (semester 1)	English	Gent	se	eminar	
			le	cture	
			ex	cursion	
			in	dependent work	
Lecturers in academic	year 2024-2025				
Janssen, Colin	Janssen, Colin LA22			lecturer-in-ch	arge
Semmouri, Ilias			LA22	co-lecturer	
Offered in the following programmes in 2024-2025			crdts	offering	
Bachelor of Scier	nce in Environmental Technology			3	А
Master of Scienc	e in Aquaculture			3	Α
Master of Science in Bioscience Engineering: Environmental Technology				3	Α
Master of Science in Bioscience Engineering: Land, Water and Climate				3	Α
Master of Science in Environmental Science and Technology				3	Α
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)				3	Α
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)				3	А
Exchange Progra level)	amme in Bioscience Engineering: La	nd and Forest manageme	nt (mastei	r's 3	А

# 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**

Seminar, Excursion, Lecture, Independent work

# 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.

# Study material

Type: Slides

Name: Applied marine ecology Indicative price: Free or paid by faculty Optional: no Language : English Available on Ufora : Yes Online Available : No Available in the Library : No Available through Student Association : No

#### Type: Audiovisual Material

Name: Applied marine ecology Indicative price: Free or paid by faculty Optional: no Language : English Available on Ufora : Yes Online Available : No Available in the Library : No Available through Student Association : No Usability and Lifetime within the Course Unit : regularly Usability and Lifetime within the Study Programme : regularly Usability and Lifetime after the Study Programme : not

#### Type: Excursion

Name: Applied marine ecology - field excursions Indicative price: Free or paid by faculty Optional: no

#### 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 assessment with multiple-choice questions, Written assessment with open-ended questions

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

Written assessment with multiple-choice questions, Written assessment with open-ended 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.