GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Applied Marine Ecology (C003897)

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

Credits 6.0 **Study time 150 h**

Course offerings in academic year 2026-2027

A (semester 2)	English	Gent

Lecturers in academic year 2026-2027

Corinaldesi, Cinzia	ANCONA01	lecturer-in-charge
Danovaro, Roberto	ANCONA01	co-lecturer
Lo Martire, Marco	ANCONA01	co-lecturer
Tangherlini, Michael	ANCONA01	co-lecturer

Offered in the following programmes in 2026-2027	**crdts**	**offering**
International Master of Science in Marine Biological Resources	6	A

Teaching languages

English

Keywords

Marine pollution, anthropogenic impacts, biological indicators, Marine Strategy Framework Directive

Position of the course

The includes theoretical lectures and educational trips and/or practical activities to train the students on the typologies of anthropogenic impacts on marine environment, the responses of biological communities and marine ecosystems (even in terms of functioning), the method of analysis and identification of these forms of impact, mitigation tools and strategies to restore degraded ecosystems. All of this will be framed in the context of the current European regulations for monitoring the health status of marine ecosystems and existing principles of conservation and protection of marine resources. At the end of the course students will be able 1) to identify the different typologies of anthropogenic impacts and their characteristics; 2) to assess their causes and consequences on marine life; 3) to describe the strategies for mitigating the effects of pollution and impacts on marine ecosystems. Finally, the student will learn 5) the current European Directive and existing regulations for protecting the health of marine life and ecosystems.
The skills acquired in the framework of the course will help to improve students' ability to formulate scientific hypotheses and analyse practical issues, which will be tackled during the course "Field practices in marine monitoring".

Contents

Marine pollution and anthropogenic impacts: vulnerability and pollution of marine ecosystems, classification and sources of marine pollution (organic, chemical, biological, light, acoustic, thermal pollution, exploitation of resources and energy from the sea, introduction of non-native species). Eutrophication, mucilage and toxic algae: trophic status indicators and models, strategies for control and for the study of toxic algae. Pollution due to hydrocarbons: Ecological effects of oil spills, strategies to contain and recover the oil spill. Plastic and microplastic impact on marine life and ecosystems. Impact of pharmaceuticals and personal care products: sources and potential effects on organisms. Microfouling and macrofouling: (eco-compatible) strategies for biofouling control. The impact of trawling on marine habitats: methods and tools for studying the impact of trawling,

direct and indirect environmental effects of trawling, by catch and ghost fishing. The impact of intensive aquaculture: ecological effects of mariculture and strategies for studying and mitigate the impacts. The introduction of non-native species: definition and sources of alien species, the effects of the invasion of alien species and strategies to avoid the impact. Frauds associated with marine food: the case of the Pangasius and Halibut. Global changes and multiple stressors. Criteria for assessing the quality of the marine environment: biological indicators and biotic indexes, the Marine Strategy Framework Directive.
Case studies presented during the include: pollution in the Mediterranean Sea, eutrophication and mucilage in the Adriatic Sea, the Fukushima disaster, the incidents of large tankers and the case of Agip Abruzzo and Deepwater Horizon, invasion of alien species in Black Sea, impact of fish farms in the Mediterranean, the impact of sunscreens on coral reefs.

Initial competences

Basic knowledge of marine biology and ecology, marine zoology and algal biodiversity.

Final competences

1 Knowledge of the different typologies of anthropogenic impacts on marine life and ecosystems.
2 Knowledge of the main causes and effects of anthropogenic impacts and global changes.
3 Ability to apply the scientific methods for assessing anthropogenic impacts and investigating their effects.
4 Knowledge of the strategies for mitigating the effects of pollution and impacts on marine ecosystems.
5 Knowledge of the current European Directive and existing regulations for protecting the health of marine life and ecosystems.
6 The course aims at training students on the main features of the anthropogenic impacts and global changes of marine ecosystems and monitoring and mitigation techniques and restoration approaches of degraded ecosystems in relation to the new European Directive Marine Strategy Framework Directive.
7 The scope of the course is also to provide the students with theoretical bases to be applied during field activities conducted in the course: Field practices, sampling design and census of marine communities, and to develop their ability to formulate scientific hypotheses for analyzing current environmental issues through the elaboration of collected data and final evaluation of the results obtained.

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, Practical

Extra information on the teaching methods

Theoretical lectures, analysis of case studies, field and laboratory work, excursion, seminars

Study material

None

References

Suggested reading:
- R. B. Clark. 2001. Marine Pollution. Oxford University Press. Barange et al. Marine Ecosystems and Global Change. Oxford University Press. 2010. Crowe and Frid 2015.
- Marine Ecosystems: Human Impacts on Biodiversity, Functioning and Services. Cambridge University Press.

Course content-related study coaching

The support from post doc is guarantee for field and laboratory activities.

Assessment moments

end-of-term 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

Oral assessment, Written assessment with multiple-choice questions

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

The end-of-term evaluation consists of a multiple-choice test (30 questions) and two open questions-responses about the anthropogenic impacts on the marine environment, the identification of methodologies for their study/assessment, and the adequate monitoring and recovery strategies to be applied. It will be evaluated the ability to identify and define the appropriate strategies of analysis, assessment and resolution of proposed problems through the use of proper terminology and capability to connect the different topics covered.

Calculation of the examination mark

Each question of the multiple-choice test can have one or more right responses and is worth 1 point if all the responses are right. The open responses are worth 2 points. The mark is calculated on the basis of the number of right responses. The highest score is 30 cum laude.
Examination during the second examination period is possible based on multiple choice test or oral exam