GHENT UNIVERSITY

Course Specifications

From the academic year 2020-2021 up to and including the academic year

Coastal Ecosystem Ecology and Functioning (C004297)

Due to Covid 19, the education and assessment 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 6.0 **Study time 150 h** **Contact hrs** 60.0h

Course offerings in academic year 2021-2022

A (semester 1) English Gent

Lecturers in academic year 2021-2022

Pruski, A.	PARIS01	lecturer-in-charge
Orignac, Jadwiga	PARIS01	co-lecturer

Offered in the following programmes in 2021-2022	**crdts**	**offering**
International Master of Science in Marine Biological Resources	6	A

Teaching languages

English

Keywords

Functional ecology, biogeochemistry, Bentho-pelagic coupling, sediment-organism interactions

Position of the course

Coastal ecosystems provide many services to an increasing human population, but their intensive use modify the conditions for marine life. This course is devoted to understand, in an integrated manner, the functioning of coastal ecosystem, detailing processes that are involved.
The course focuses on the functional ecology of coastal ecosystems. We will use the diversity of benthic habitats in the Mediterranean Sea to study the drivers that control coastal ecosystem functioning and sustainability.
The course is at the interface between ecology and biogeochemistry. The processes studied and the new practical competencies are transferable to other benthic environments: deep benthic environments (hydrothermal, cold seeps ...), mangroves ..but also pelagic ones (ex. use of fatty acid biomarkers to study food webs,...).

Contents

- Introduction to coastal ecosystems: their diversity and particularities
- Integrated view of main biogeochemical and biological processes in coastal environments
- Comprehensive understanding of coastal sediment ecology: properties, functioning and relationship between the organisms and the sediments
- Comprehensive understanding of the role of benthic organisms on carbon cycling (engineer species)
- Knowledge of the methods for the study of benthic processes

Initial competences

Basic Biological Oceanography

Final competences

1 Students will understand what are the main processes that govern marine ecosystem functioning in coastal waters.
2 Students will understand how marine organisms affect these processes.
3 Students will understand how to study the bentho-pelagic coupling in coastal ecosystems.
4 Students will understand how to use these new competencies to manage and

protect marine coastal environments.

5 Students will have acquired transferable tools for:

1 Designing and peforming mesocosm experiments
2 Studying meiofauna: extraction method, biomass estimation, taxa identification
3 Determining the origin and quality of organic matter in sediments with lipid biomarkers
4 Measuring solute fluxes: chemical sensors, nutrient analyses...
5 Learning to conduct multidisciplinary research and critical thinking
6 Interpreting and reporting scientific results

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, Lecture, Project

Extra information on the teaching methods

The course is organized around two practical projects. For each project, the concepts are briefly presented during a lecture, and then practical works enable to illustrate the concept and methods of study. Students will carry out experiments, perform biochemical and chemical analyzes and sort and identify the meiofauna. They will then interpret their results and compare them to the literature. The expensive practical and laboratory trainings will thus give transferable skills to the students.

The first practical work (PW1) aims to demonstrate the existence of the benthic-pelagic coupling. We will study the response of the benthic compartment by simulating a phytoplankton bloom in mesocosms. O2 consumption, use of nitrates / nitrates and release of silicates will be monitored during the experiment. In parallel, we will see that the organic matter degrades quickly in the sediments.

The 2nd practical work (PW2) focuses on the fate of organic matter. We will characterize the origin and the reactivity of the organic matter using the analysis of lipid biomarkers in GC-MS (gas chromatography coupled with mass spectrometry). We will produce chemical profiles using sensors to calculate the diffusive fluxes. We will investigate the functional role of meiofauna by determining abundance, biomass and respiration rate in different habitats (posidonia meadows, sandy bottoms and muddy bottoms).

Learning materials and price

All material necessary is provided to students.

References

A selection of scientific publications is provided to students through the MOODLE platform.

Students may also read :

- Biogeochemistry of estuaries T. Bianchi
- Marine Biology J.S. Levinton
- Le golfe du Lion A. Monaco et al.
- Ecology of Coastal Waters: With Implications For Management K.H. Mann
- Global coastal change I. Valiela

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

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

Written examination

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

Written examination

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Students are evaluated by a written examination (interpretation of figures from scientific articles) for 60% of the mark and an oral evaluation (powerpoint presentation of a practical) for 40% of the mark.

Calculation of the examination mark

- 60% Written Exam
- 40% Practical Assignments