GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Marine Ecotoxicology (C004351)

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

Regoli, Francesco	ANCONA01	lecturer-in-charge
Benedetti, Maura	ANCONA01	co-lecturer
Fattorini, Daniele	ANCONA01	co-lecturer
Giuliani, Maria	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, Bioindicator organisms, Biomarkers, Cellular effects, Environmental Risk Assessment

Position of the course

At the end of the Course the student will have the capability to: describe main characteristics of chemicals and environmental distribution pathways; organize and plan a biomonitoring program, choose bioindicators, define appropriate analyses and biomarkers to investigate, identify the more appropriate methodological practices; evaluate problems and results related to biomagnification, bioaccumulation and toxicological effects at molecular, cellular and organismal levels; propose multidisciplinary, weight of evidence approaches in ecosystem health and ecological risk assessment.
The student will acquire transversal competences including the integration between chemical properties of environmental pollutants and their biological effects: chemical-physical characteristics of such compounds, sources of input and distribution among environmental matrices will be better evaluated in terms of mechanism of accumulation, detoxification, differences of responsiveness and sensitivity of various species. These transversal competences will be further enhanced by practical exercitations when students will acquire preliminary skills on analytical methodologies of chemicals in environmental matrices and biological tissues, as well as on toxicological measurements at molecular and cellular level.

Contents

The Course is focussed on modern principles of environmental toxicology, from description of the main classes of traditional and emerging pollutants, to the toxicological implications on various biotic components and ecosystem health. Particular emphasis will be given to bioindicator organisms, molecular and cellular responses to pollutants, detoxification pathways and mechanisms of toxicity, practical use of biomarkers, biological and toxicity tests in research, normative guidelines and ecological risk assessment.

Initial competences

A good knowledge of basic chemistry, ecology and cell biology is useful for this course.

Final competences

1 Knowledge on fate and distribution pathways of traditional and emerging pollutants.
2 Knowledge on bioaccumulation mechanisms and practical implications in interpreting results of biomonitoring programmes, and predicting biomagnification risks.
3 Knowledge on molecular and cellular mechanisms of detoxification, interactions and toxicity of chemical mixtures and multiple stressors.
4 Knowledge on principles and practical use of organismal toxicity in regulatory and normative guidelines.
5 Understanding advantages and limitations of multidisciplinary approaches and basic knowledge on weight of evidence models in ecological risk assessment.

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

Extra information on the teaching methods

The course is based on both theoretical lessons and practical exercitations on the main chemical contaminants, their environmental distribution and biological effects, bioindicator organisms, molecular and cellular responses to pollutants.

Study material

None

References

All the material presented during the course will be provided, including slides and scientific literature suggested on specific topics.
Selected chapters from the following books:

- Fundamentals of Aquatic Toxicology. Edited by Gary M. Rand, Taylor & Francis
- Aquatic Toxicology. Molecular, biochemical and cellular perspectives. Edited by Malins and Ostrander, Lewis Publishers
- Ecotoxicology: a comprehensive treatment. Edited by Newman and Clements, CRC Press
- Endocrine disruption. Biological bases for health effects in wildlife and humans. Edited by Norris and Carr, Oxford University Press
- Biomarkers in Marine Organisms: a practical approach. Edited by Garrigues et al., Elsevier

Additional references will be given during the Course

Course content-related study coaching

Assessment moments

end-of-term assessment

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

Oral assessment

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

Oral assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

The examination is oral, based on questions and following discussion related to environmental pollutants, bioaccumulation mechanisms, detoxification pathways and onset of toxicity, monitoring and assessment of ecotoxicological risk.

During the examination, it will be evaluated the capability of the student to properly answer and discuss various issues, the general competence on problematics, the use of appropriate terminology, the capability to move from a topic to another one and make transversal links.
The final assessment will be given depending on the capability of the student to answer all the questions, general competence and ability to properly discuss various issues.

Calculation of the examination mark

The final assessment is made of thirty.
The examination is considered as passed with a vote of 18/30 or higher.
The student can decide to decline the proposed vote and give again the examination in the following session.
The final assessment will be given depending on the capability of the student to answer all the questions, general competence and ability to properly discuss various issues.