

Chemical and biological monitoring (WE-DBIO-12911)

Responsible Academic	Lieven Bervoets/ Dries Knapen
Email	lieven.bervoets@ua.ac.be dries.knapen@ua.ac.be
Homepage URL	www.ecotox.be
Department	Biology
Faculty/Subunit	Science
University/Institute	University of Antwerp

Course Summary

6	study credits (SP)
60	hours of study load (ST)
40 (20+20)	contact hours of lecture (HOC)
10	contact hours of Seminars or Practical exercises (WPO)
10	hours of Independent or External Form of Study (ZELF)

Course level and orientation

<input type="checkbox"/> 1 st year ECOMAMA	<input type="checkbox"/> 1 st semester
<input checked="" type="checkbox"/> 2 nd year ECOMAMA	<input checked="" type="checkbox"/> 2 nd semester

This course is:

<input type="checkbox"/> Compulsory
<input checked="" type="checkbox"/> Optional

Course level:

<input type="checkbox"/> Introductory course
<input type="checkbox"/> Advanced course
<input type="checkbox"/> Fundamental course
<input checked="" type="checkbox"/> Specialized course
<input type="checkbox"/> Supporting course
<input type="checkbox"/> Laboratory and field training course

Competences

This course explicitly contributes to the following competences of the curriculum of Master of Ecological Marine Management:

General

- Developing the own learning process
- Learning to work in a team
- Searching for data sources
- Analysing and synthesising the learning material
- Presenting and transferring the acquired knowledge
- Reporting in various ways

Domain specific

- Gaining fundamental scientific knowledge and insight in marine sciences
- Developing laboratory skills
- Developing practical management skills
- Planning and conducting marine research in an autonomous way
- Understanding, judging and interpreting research results
- Analytical and problem-solving thinking
- Using research supporting tools (e.g. Biostatistics, GIS etc.)
- Critically evaluating and integrating multidisciplinary scientific information
- Translating scientific information into advice for sustainable marine management
- Communicating scientific findings to various kinds of audiences

Learning targets and goals

Prerequisites

Course content

Environmental monitoring and biomarkers of anthropogenic stress

Part I (20 hours theory + 10 hours seminar – Lieven Bervoets)

The course covers different aspects of chemical and biological monitoring methods applied to estuarine and marine environments and the importance of such studies in the management of estuaries, coastal and marine ecosystems. Different chemical and biological methods are presented including an overview of most important sampling methods (i.e. sampling strategies and sampling devices), analytical chemistry (e.g. atomic absorption spectrometry, liquid chromatography, gas chromatography, mass

spectrometry) and biological methods (e.g. passive and active biological monitoring, different types of toxicity tests, application of biomarkers). During the practical exercises students get hands on experience with the different methods. The course also includes a field study in which different aspects of chemical and biological monitoring are applied to a real life situation (i.e. the Scheldt estuary). The results are analyzed according to international standards and guidelines and a report written and presented.

Part II (20 hours theory – Dries Knapen)

The second part of the course deals with general principles of stress in organisms. General effects of stressors on the intermediary metabolism is discussed, followed by an overview of interesting endpoints that can be used to evaluate the health status of organisms. Biomarkers are introduced on two levels: biomarkers of effects and biomarkers of exposure. Mechanisms of toxicological stress are explained at the molecular, biochemical and physiological level. An overview of the most recently used biomarkers in environmental monitoring is given. Finally we deal with the various aspects of genotoxicity: how chemicals cause mutations; how DNA is repaired; how structural damage at the DNA leads to adverse effects at the organismal level. Here again an overview of different techniques is presented which have been used in environmental toxicology.

Study material

Will be provided by the lecturers.

Assessment mode

Part	% of final score	Mode of assessment	Possibility of mark transfer
HOC (Bervoets)	30	Oral exam with written preparation	
HOC (Knapen)	40	Oral exam with written preparation	
WPO (Bervoets)	30	Oral presentations	

Additional information