GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2022-2023

Water Quality Management (I002698)

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

Credits 4.0 **Study time 120 h** **Contact hrs** 40.0h

Course offerings in academic year 2022-2023

A (semester 2) English Gent

Lecturers in academic year 2022-2023

Goethals, Peter LA22 lecturer-in-charge

Offered in the following programmes in 2022-2023	crdts	offering
Master of Science in Aquaculture	4	A
Master of Science in Bioscience Engineering: Environmental Technology	4	A
Master of Science in Bioscience Engineering: Forest and Nature Management	4	A
Master of Science in Bioscience Engineering: Land, Water and Climate	4	A
Master of Science in Environmental Science and Technology	4	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	4	A
Exchange Programme in Bioscience Engineering: Land and Forest management (master's level)	4	A

Teaching languages

English

Keywords

Monitoring, impacts, assessment, sustainable water management, standards, ecological assessment, objectives of management, measurements of management

Position of the course

This course provides basic and applied information and know how on the components and processes in aquatic ecosystems. Sources and impacts on these systems are presented, as well as monitoring, assessment and management methods.

Contents

•Introduction: what is water quality management? Relation with sustainable development goals and sustainable water management
•Water quality monitoring (habitat, chemical and biological, standards and basic and advanced technologies (e-DNA and biotechnology, drones, probes, tags, camera's, citizen science))
•Water quality modelling (data driven approaches + mechanistic models for system analysis (diagnosis) and forecasting (scenario analysis, cost-benefit analyses))
•Water quality assessment (chemical and biological indices, standards, ecosystem services, sustainability assessment)
•Water quality protection and restoration management (approaches, directives and legislation, actors, stakeholders, project management), including a case-study on aquaculture sector
•Recent developments: big data, video mining, internet of things, smart water systems, citizen science, co-creation, blue and green growth, natural capital, glocal networks (recent articles and guest speakers from government, companies and presentations by international experts)
•Case study: field monitoring and modelling exercise
The students have to work in groups about a certain case study. They have to find

out a strategy of monitoring, take physical and chemical measurements and they also have to take some samples in lentic and/or lotic waters. Further they also have to analyse the chemical and biological samples, calculate the indices, apply some basic modelling techniques, assess the results and develop the proper management measures.

Initial competences

Basic knowledge of general ecology and chemistry are sufficient to follow this course.

Final competences

1 know which activities have an impact on the quality of the surface waters
2 know what the effects of human activities are on aquatic systems and have to know how to avoid or how to lower these activities
3 be able to present the different methods of monitoring for the different types of surface waters and their impacts and they also have to be able to present the different instruments and methods for monitoring
4 be able to know the proper measures of management so that the different types of impacts are lowered and they have to place it in the context of the Water Frame Work Directive and Integrated Water Resource Management
5 be able to define sustainable development of water and the different examples and applications
6 be able to carry out a sampling of surface waters and with the results they have to make an interpretation of the water quality

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

Practicum, Group work, Lecture, Self-reliant study activities, Fieldwork

Extra information on the teaching methods

The course consists of two main parts: theory and practice. The theory entails several lectures, combined with guided exercises and guest lecturers. The practical part entails both field and lab work, during which there will be a focus on the evaluation of water quality based on the chemical and biological conditions. Students have to write a group report about the obtained results. This practical exercise is an obligatory part of this course.

Learning materials and price

slides and notes are provided via the electronic learning platform

References

Diverse recent books (among other of IWA), national and international reports (EPA, Flemish Environment Agency, STOWA) and recent articles

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 with open questions

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

Written examination with open questions

Examination methods in case of permanent assessment

Report, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

Evaluation is based on period-bound (75 %) and non-period-bound (25 %) evaluation.

1) Period-bound (75 %): exam

The exam consists of a combination of (i) short and long theoretical questions and (ii) a series of insight questions. Examples of both are provided throughout the course, allowing students to deal with similar cases. Additionally, a list with example questions is available on the electronic learning platform.

2) Non-period-bound (25 %): report

The report is based on the field and lab work.

The examinator can fail students who eschew from the period-bound and non-period bound evaluation.

Calculation of the examination mark

Period-bound (exam): 75%

Non-period-bound (report): 25%

Students who eschew period-bound and/or non-period-bound evaluations for this course unit may be failed by the examinator.