Analysis of Organic Micropollutants (I001487)

Course Specifications
Valid as from the academic year 2019-2020

Course

Credits 3.0
Study time 75 h
Contact hrs 37.5 h

Course offerings and teaching methods in academic year 2019-2020
A (semester 2) Dutch

group work 8.75 h
lecture 15.0 h
excursion 3.75 h
microteaching 3.75 h
seminar: coached 6.25 h
exercises

Lecturers in academic year 2019-2020
Demeestere, Kristof

LA24 lecturer-in-charge

Offered in the following programmes in 2019-2020

Master of Science in Bioscience Engineering: Environmental Technology

3 credits

A offering

Teaching languages
Dutch

Keywords
chemical (trace) analysis, organic pollutants, environmental matrices, air, water, soil, sediment, biota

Position of the course
To acquire thorough knowledge of complex biological, chemical and physical processes in environmental research and technology, sensitive analytical methods for identification and quantification of environmental relevant compounds are very often needed. This course particularly focuses on the principles and applications of organic micropollutant analysis in environmental matrices (air, water, soil, sediment and biota). Attention is paid to sampling and sample preparation, advanced chromatography and mass spectrometric detection. Students are taught to get familiar with the development and application of an entire analytical method, with attention to the underlying physical-chemical principles of the method, and taking into account important issues with respect to data assessment and interpretation. Practical examples and specific case studies are discussed to illustrate the content of this course.

Contents
1. Sampling methods used in environmental organic analysis
2. Sample preparation and clean-up for analysis of organic micropollutants in environmental matrices
3. Advanced gas and liquid chromatographic separation techniques
4. Mass spectrometric detection of organic compounds
5. Data analysis and interpretation
6. Quality control and assurance
7. Case studies

Initial competences
Analysis of organic micropollutants builds on certain learning outcomes of "Organic chemistry: structure" and "Organic chemistry: reactivity", "Chemical Analytical Methods", "Environmental Chemistry" and "Process Engineering" ; or the learning outcomes were achieved differently.

Final competences

(Approved) 1
1 Define and argue the consecutive steps in an environmental oriented analytical process.

2 Describe and have insight in modern approaches to analyse organic micropollutants in environmental matrices with aid of state-of-the-art techniques.

3 Assess critically advantages and disadvantages of different methods and be able to make argued choices between them.

4 Deal with an environmental analytical problem in an individual and independent way and be able to critically report on it, both in a written and an oral way and making use of the correct terminology.

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
Excursion, group work, lecture, microteaching, seminar: coached exercises

Extra information on the teaching methods
Theory is taught through plenary lectures. Complementary coached exercises are organized in smaller groups during seminars. An excursion to an analytical environmental laboratory is organised. Finally, students have to work in small groups (about 3 students) on an environmentally analytical case study, and report on it in both a written and oral way. The latter takes place plenary through a didactic presentation followed by a discussion with the whole class.

Learning materials and price
A syllabus and notes for the exercises are available. Additional information and supporting learning material is distributed via Ufora. Cost is estimated at 15 to 20 €.

References
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Course content-related study coaching
During exercises and in view of the group work, students are coached in small groups by the assisting personnel of the department involved in teaching of this course. The lecturer can be contacted after each plenary lecture or by appointment for additional explanation or questions.

Evaluation methods
end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions

Examination methods in case of permanent evaluation
Participation, assignment

Possibilities of retake in case of permanent evaluation
examination during the second examination period is possible in modified form

Extra information on the examination methods
Theory: period aligned evaluation by means of a written closed-book exam. Exercises and group work: period aligned evaluation as a part of the written closed-book exam; and non-period aligned evaluation of the written and oral reporting of the case study to be handled in small groups (assignment). Students are evaluated on their knowledge on the theoretical and physical-chemical background of the analytical methods and they have to be able to relate them to practical applications. Students must be able to interprete analytical data in a practical context and to assign chemical structures.

Calculation of the examination mark
The final examination mark is calculated as the weighted average of the submarks obtained for the period aligned and non-period aligned evaluation. The period aligned evaluation gets a weight of two thirds in the calculation of the final mark; the non-period aligned evaluation a weight of one third. Non-integers obtained as the result of the final mark calculation are rounded off according to the classical rounding off rules.

(Approved)
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner. This implies for instance that not actively participating in all seminars related to this course and/or a late submission of the group work report, can result in failing for this course.