Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Lecturers in academic year 2020-2021
Verheust, Yannick LA23 staff member
Dumoulin, Ann LA24 lecturer-in-charge

Course offerings and teaching methods in academic year 2020-2021
A (semester 1) Dutch Kortrijk
lecture 12.0 h
practicum 18.0 h

Offered in the following programmes in 2020-2021
Bachelor of Science in Bioindustrial Sciences
credits offering
3 A

Teaching languages
Dutch

Keywords
Atomic Spectroscopy, AAS, AES, XRF, molecular spectroscopy, UV/VIS-spectroscopy, Fluorescence, IR spectroscopy, Raman spectroscopy, Mass spectrometry, ICP-MS

Position of the course
The goal of this course is to provide the students with an overview of the important spectroscopic analytical methods. For each technique, we will discuss the theoretical background, the instrumentation, qualitative and quantitative analysis and the applications. The course aims at providing knowledge and insight by theoretical considerations, examples and exercises. During the labs, the students will gain hands-on experience and practical skills on the spectroscopic techniques.

Contents
1 Pre-analysis: sample destruction
2 Introduction to spectroscopy
3 Atomic Spectroscopy
   1 Flame Atomic Absorption Spectroscopy (F-AAS)
   2 Electrothermal Atomic Absorption Spectroscopy (ET-AAS)
   3 Laser induced breakdown spectroscopy (LIBS)
   4 Inductively coupled plasma optical emission spectroscopy (ICP-OES/ICP-MS)
4 Molecular spectroscopy
   1 UV/VIS- absorption
   2 Fluorescence
   3 IR-Spectroscopy (incl. FTIR, ATR-IR, NIR)
Practicum
lab exercises following the theoretical course.
Examples: determination of free fatty acids in oil with FT/IR, determination of K$^+$ in water with AES and validation of the method, determination of metals in cattle feed with ICP, determination of COD of waste water.

Initial competences
The course builds on certain learning outcomes of the following course units: 'General Chemistry', 'Analytical Chemistry'.

Final competences
1 Have knowledge and insight in the possibilities and limitations of the spectroscopic analytical methods and be able to apply this for complex analytical problems.
2 Knowledge of the parts and the operation of the instrumentation.

(Approved)
3 He/she has gained the analytical skills, methods and technologies to conduct the experiments in team, including the implementation of environment, health and safety rules
4 Statistical treatment of the data, interpretation and communication of the 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
Lecture, practicum

Extra information on the teaching methods
18h hands-on lab in small groups
12 h lectures with powerpoint presentation and coached exercises

Learning materials and price
Dutch syllabus for theoretical course, €16
Notes for practical exercises

References
overige referenties worden per hoofdstuk weergegeven

Course content-related study coaching
The teaching staff (both professor and teaching assistants) can always be contacted to solve problems. The learning platform will be used to post exercises and solutions of exercises.

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, oral examination

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

Examination methods in case of permanent evaluation
Oral examination, skills test, job performance assessment, report

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
permanent evaluation: evaluation of attitude, knowledge and technical skills during the hands-on lab sessions. Evaluation of the results in written reports, video reports and lab notebook. Evaluation of the results of the measurements and a lab exam (a practical test and oral explanation of the lab notebook)
periodic evaluation: written preparation of examination with open questions and exercises followed by oral discussion

Calculation of the examination mark
First examination period
periodic evaluation (theory/exercises): 50%
permanent evaluation (practicum): 50%
In order to pass, one has to attain a score of at least 8/20 for both periodic and permanent evaluation. If this condition is not fulfilled, and when the calculated score is 10/20 or more, the student may be failed by the examiner and gets a score of 9/20. Students who eschew (part of) non-period aligned evaluations for this course get score AFW for the permanent evaluation.

Second examination period

(Approved)
periodic evaluation: 50 %
permanent evaluation:
40%: score from the first examination period
10%: replacement assignment in order to re-evaluate part of the lab skills
In order to pass, one has to attain a score of at least 8/20 for both periodic and
permanent evaluation. If this condition is not fulfilled, and when the calculated score is
10/20 or more, the student may be failed by the examiner and gets a score of 9/20.