Chromatographic Techniques (I620024)  
Valid as from the academic year 2020-2021

Course Specifications

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.

Course size  
(nominal values; actual values may depend on programme)
- Credits 5.0
- Study time 150 h
- Contact hrs 50.0 h

Course offerings and teaching methods in academic year 2020-2021
- A (semester 2)  
  - Dutch  
  - Kortrijk  
  - practicum 30.0 h
  - lecture 20.0 h

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

Offered in the following programmes in 2020-2021
- Bachelor of Science in Bioindustrial Sciences  
  - 5  
  - A
- Linking Course Master of Science in Biochemical Engineering Technology  
  - 5  
  - A

Teaching languages
- Dutch

Keywords

Position of the course
- The goal of this course is to provide the students with an overview of the important analytical separation methods. For each technique, we will discuss the theoretical background, the instrumentation, qualitative and quantitative analysis and the applications and problem solvings.
- 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 chromatographic instruments.

Contents
- The course consists of 2 parts: a theoretical course and hands-on lab experiments. The course covers the following topics:
  1. Pre-Analysis: sample pretreatment for gaseous, liquid and solid samples
  2. Introduction to analytical separations, types of chromatography, efficiency of separation
  3. Gas Chromatography: Efficiency, instrumentation, qualitative and quantitative analysis
  4. HPLC: Efficiency and optimization of the separation, instrumentation, qualitative and quantitative analysis
  5. Planar separation: Paper Chromatography and thin layer chromatography, instrumentation, method, qualitative and quantitative analysis
  6. Exclusion chromatography: principles, methods, instrumentation, applications
  7. Ion exchange chromatography: principles, instrumentation, applications
- Practicum  
  - lab exercises following the theoretical course such as fatty acid composition, analysis of volatile fatty acid in digestate, analysis of alcohol in wine, analysis of aspartame and caffeine drinks, analysis of volatile compounds in perfume or feed with SPME and GC/MS, GC-analysis etheric oils in feed additives, determination of acetic acid and ethanol in wine vinegar,....

Initial competences
- The course builds certain learning outcomes of the following course units: ‘General

(Approved)
Chemistry' and 'Analytical Chemistry'.

Final competences

1. The student has knowledge and insight in the possibilities and limitations of the analytical separation methods and is able to apply this for complex analytical problems in his/her specialization. He/She can apply this knowledge to complex chemical-analytical problems in his/her field.
2. The student understands the theoretical background of chromatography, has knowledge of the parts and the operation of the instrumentation.
3. He/ she can implement and optimize an existing analysis procedure (scientific literature, application notes, standards).
4. He/ she has gained the analytical skills, methods and technologies for the chromatographic experiments in a team, including the implementation of environment, health and safety rules.
5. 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

20 h lectures with powerpoint presentation and coached exercises
30h hands-on lab in small groups

Learning materials and price

Dutch syllabus for theoretical course, €18

Notes for practical exercises

References


Course content-related study coaching

The teaching staff (both professor and teaching assistants) can allways be contacted to solve problems. Minerva 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

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

periodic evaluation: written preparation of examination with open questions and exercises followed by oral discussion
permanent evaluation: evaluation of attitude, knowledge and technical skills during the hands-on lab sessions, written reports and/or video reports

Calculation of the examination mark

First examination period

(Approved)
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

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.