## Course Specifications

Valid as from the academic year 2019-2020

### Chemical Analytical Techniques (I002444)

<table>
<thead>
<tr>
<th>Course size</th>
<th>Credit</th>
<th>Study time</th>
<th>Contact hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>(nominal values; actual values may depend on programme)</td>
<td>4.0</td>
<td>120 h</td>
<td>40.0 h</td>
</tr>
</tbody>
</table>

### Course offerings and teaching methods in academic year 2019-2020

<table>
<thead>
<tr>
<th>Offered</th>
<th>Language</th>
<th>Seminar</th>
<th>Exercise</th>
<th>Lecture</th>
<th>Practicum</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (semester 2)</td>
<td>Dutch</td>
<td>seminar: coached</td>
<td>exercises</td>
<td>lecture</td>
<td>practicum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.75 h</td>
<td></td>
<td>22.5 h</td>
<td>13.75 h</td>
</tr>
</tbody>
</table>

### Lecturers in academic year 2019-2020

- Demeestere, Kristof
  - LA24 lecturer-in-charge
- Du Laing, Gijs
  - LA24 co-lecturer

### Offered in the following programmes in 2019-2020

<table>
<thead>
<tr>
<th>Programmes</th>
<th>Credits</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Agricultural Sciences)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Cell and Gene Biotechnology)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Chemistry and Food Technology)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Environmental Technology)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Forest and Nature Management)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Bachelor of Science in Bioscience Engineering (main subject Land and Water Management)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Joint Section Bachelor of Science in Bio-Engineering</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Preparatory Course Master of Science in Bioinformatics (main subject Bioscience Engineering)</td>
<td>4</td>
<td>A</td>
</tr>
</tbody>
</table>

### Teaching languages

- Dutch

### Keywords

- Analytical process
- Inorganic analytical techniques
- Separation techniques
- Chromatography
- Electrophoresis
- Molecular spectroscopy
- Mass spectrometry
- Calibration
- Analytical performance characteristics

### Position of the course

All students bioscience engineering need to be familiar with the principles of analytical techniques that can lead to qualitative and quantitative information about the composition and structure of (living) matter. This course aims at providing insights in the structure of a chemical-analytical process, as well as knowledge and skills regarding the principles, performance and applications of commonly used analytical methods and techniques. Focus is put on molecular separation and detection techniques that are widely used in the field of bioscience engineering.

### Contents

1. The chemical-analytical process, calibration and analytical performance characteristics
2. Inorganic analytical techniques: gravimetry, volumetry, electrochemical methods
3. Molecular spectroscopy (IR, UV-vis, NMR) and mass spectrometry (MS): introductory principles
4. Molecular separation techniques

(Approved)
4.1 Chromatography: theoretical considerations
4.2 Gas chromatography
4.3 Liquid chromatography
4.4 Introduction to electrophoresis

Initial competences

Chemical analytical techniques builds on learning outcomes of the course units 'General and Inorganic chemistry: Structure', 'General and Inorganic chemistry: Reactivity', 'Organic Chemistry: Structure', and 'Organic Chemistry: Reactivity'; or the learning outcomes have been achieved differently.

Final competences

1. Have insight in the structure of and interlinks within a chemical-analytical process.
2. Have knowledge of the fundamental principles, underlying mechanisms and application potentials of commonly applied analytical separation and detection techniques (inorganic analysis, gas and liquid chromatography, electrophoresis, molecular spectroscopy and mass spectrometry).
3. Have a thorough knowledge of definitions, units and terminology to describe quantitative and qualitative chemical analytical data.
4. Be able to interpret and report analytical results in an objective way and to assess the performance of an analytical method.

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, seminar: coached exercises

Learning materials and price

A syllabus and notes for practical exercises are available. Additional information and supporting learning material is provided through Ufora.

References

Course content-related study coaching

During lab sessions and exercises, students are coached in small groups by the assisting personnel of the department involved in the teaching of the 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, report

Possibilities of retake in case of permanent evaluation

Not applicable

Calculation of the examination mark

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