

## Spectroscopic Methods of Analysis (C000452)

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

Credits	5.0	Study time	145 h	Contact hrs	54.0 h
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Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	Dutch	lecture	25.0 h
		seminar: coached	10.0 h
		exercises	
		practicum	20.0 h

Lecturers in academic year 2018-2019

Vincze, Laszlo	WE08	lecturer-in-charge
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Offered in the following programmes in 2018-2019

<a href="#">Bachelor of Science in Chemistry</a>	crdts	offering
	5	A

Teaching languages

Dutch

Keywords

Atomic spectroscopy, molecular spectroscopy, UV/VIS, luminescence, AAS, OES, XRF, mass spectrometry, ICP-MS

Position of the course

This course presents an overview of the most important spectroscopic methods of analysis. Principles are explained, instrumentation is described and the capabilities and limitations of the methods are discussed. Finally, attention is paid to relevant applications.

Contents

- Electromagnetic radiation
- Atomic and molecular spectroscopy
- Dispersion and detection of UV/VIS-radiation
- UV/VIS-absorption spectrophotometry
- Luminescence spectroscopy
- Atomic absorption spectrometry (AAS)
- Optical emission spectrometry (OES)
- X-ray fluorescence spectrometry (XRF)
- Introduction to mass spectrometry (MS)
- ICP - mass spectrometry (ICP-MS)

Initial competences

Having already taken the course 'Analytical Chemistry: Principles' in the curriculum.

Final competences

- 1 Thorough understanding of the capabilities and limitations of the most important spectroscopic methods for inorganic analysis and their relation.
- 2 Understanding and being able to explain the operating principle of the spectrometric techniques included in the course.
- 3 Ability to select the most appropriate method of analysis for a given analytical problem.
- 4 Solving simple problems in the context of spectroscopy for inorganic analysis.
- 5 Using spectrometric techniques for quantitative determination of elements.

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

Syllabus in Dutch  
Cost: 20 EUR

#### References

Skooq, D.A. and Leary, J.J., "Principles of Instrumental Analysis" (4th ed.), Saunders College Publishing, Fort Worth, 1992  
M.T.C. de Loos-Vollebregt, Spectrometrische analysetechnieken, Bohn Stafleu Van Loghum, Houten, 2004.  
L. Ebdon, E.H. Evans, A. Fischer and S.J. Hill, An introduction to analytical atomic spectrometry, John Wiley & Sons, Chichester, 1998.  
J.R. Dean, Practical inductively coupled plasma spectroscopy, John Wiley & Sons, Chichester, 2005.  
J.A.C. Broekaert, Analytical Atomic Spectrometry with Flames and Plasmas, Wiley - VCH, Weinheim, 2005.

#### Course content-related study coaching

It is possible to ask the professor and/or academic staff questions after the lessons or by e-mail. An appointment can be made via e-mail.

#### 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, skills test, job performance assessment

#### Possibilities of retake in case of permanent evaluation

not applicable

#### Extra information on the examination methods

Periodic evaluation: Written examination with open questions. The examination will consist of overview questions, more detailed questions on specific course subjects and questions aiming at assessing the student's understanding of the matter. Also the ability to select an analytical method and evaluate its results are tested. Exercises are also included in the theoretical exam.

Non-periodical evaluation: practical excersises. The quotation of the non-periodical evaluation is for 75% on accuracy of the result, and for 25% on the attituded in the lab (a.o. knowledge of background information, work analytically and dedication). Students who are absent without any well-justified reason or who do not participate in all evaluation methods (practicals) of the continuous assessment, get a non-deliberable examination mark. The quotation for the non-periodical evaluation is transferred to the second examination period, which consists of a periodical examination only.

#### Calculation of the examination mark

The mark for the periodical evaluation contributes for 90% to the total mark. The mark for the non-periodical evaluation contributes for 10% to the total mark.

Students who are absent without any well-justified reason or who do not participate in (part of) the permanent evaluation, do not pass the exam for this course unit.

The marks resulting from the permanent evaluation are retained in the second examination period, as the second examination period only consists of a periodic evaluation.