

Instrumental Analysis (E721042)

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

Credits 6.0 Study time 180 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2019-2020

A (semester 2)	Dutch	lecture	36.0 h
		practicum	24.0 h

Lecturers in academic year 2019-2020

Vercammen, Joeri TW11 lecturer-in-charge

Offered in the following programmes in 2019-2020

	crdts	offering
Bachelor of Science in Engineering Technology (main subject Chemical Engineering Technology)	6	A
Linking Course Master of Science in Chemical Engineering Technology	6	A
Preparatory Course Master of Science in Chemical Engineering Technology	6	A

Teaching languages

Dutch

Keywords

Instrumental analysis
Chromatography
Electrochemistry
Thermal analysis

Position of the course

The main objective of the course is to provide a solid basis to interpret and address typical analytical questions fully independently, albeit supported by consultation of specialist scientific literature. Theory is dealt with pragmatically and associated with the most appropriate instrumental technique through practical examples from method development, quality control and problem solving.

Contents

Instrumental Analysis deals with three main topics, i.e. chromatography, electrochemistry and thermal analysis. All chromatographic techniques, i.e. GC, HPLC, SFC and electrophoresis, are discussed in detail, taking into account the current state-of-the-art. Therefore, multidimensional techniques (GCxGC, LCxLC) are part of the course as well as techniques to adequately prepare samples for subsequent chromatographic analyses.

Within the part Electrochemistry, conductivity, electrolysis, potentiometry, polarography, voltammetry and coulometry are discussed. Finally, thermal analysis (TGA, DTA, DSC, MTDSC, TMA, TT) are mentioned as well.

The focus of the practical exercises (attendance mandatory) is to apply the techniques mentioned in the theoretical part and to provide an overall strategy in addressing technical/scientific questions.

Initial competences

Having followed the courses of General chemistry, Inorganic chemistry and Organic chemistry. Basic knowledge of Analytical chemistry (chemical analysis) is recommended.

Final competences

1 Mastering general chemical knowledge and skills concerning the analytical chemistry.

- 2 To be able to perform chemical and chemical technical analyses and to apply them on scientific and/or engineering problems. Analyses are performed in group or on an individual basis.
- 3 The student must have insight in the different scientific/technical disciplines.
- 4 Obtain a clear insight into chemical general knowledge and basic skills and be able to link the different aspects and apply them in the chemical sector, in material analysis and in process and product control.
- 5 Acting environment, quality and safety conscious in the common chemical laboratory practice.
- 6 To be able to communicate and to report information and data, ideas, problems and solutions - especially scientific and technical ones in a comprehensive and efficient way.

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

Learning materials and price

Teacher's course (theory 2 parts) and exercises course are available

References

Principles of Instrumental Analysis 6th ed, 2006 (D.A. Skoog - D.M. West; Saunders College Publishing) (ISBN 0495012017)

Fundamentals of Analytical Chemistry 9th ed, 2013 (D.A. Skoog - D.M. West -F.J. Holler; Saunders College Publishing) (ISBN 0495558281)

Quantitative analysis, 6th ed, 1999 (R.A. Day, Jr and A. L. Underwood; Prentice Hall) (ISBN 086927932)

Analytical chemistry, 2th ed,2004 (R. Kellner, J.M. Mermet,...; Wiley - VCH) (ISBN 3527-30590-4)

Course content-related study coaching

Additional support and explanation is provided by appointment.

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

Written examination with open questions, participation, assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

In the practical exercises attendance is compulsory (including the introduction course).
In case of unjustified absence a sanction will be given.

Calculation of the examination mark

Theory : 75%
Exercises : 25%

The evaluation and implementation of the final quotation is being established through the mathematical average according to the assigned coefficients. In case however for one of the parts, less than 7/20 is being obtained, there is a deviation from the calculated end score in case this is 10 or more and the student gets a 9/20.