

# Advanced Mass Spectrometry

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10.0 credits

Course Code: 1KB158

Syllabus applies from: 2016, week 1

Responsible Department: Department of Chemistry - BMC

National Subject Category: Chemistry

Main Field(s) of Study and In-Depth Level: Chemistry: has second-cycle course/s as entry requirements (A1F) Grading System: Fail (U), 3, 4, 5.

Education Cycle: Second cycle

## Entry Requirements

Separation and Mass Spectrometry, 15 credits, or Applied Analysis of Complex Samples, 15 credits

## Aims

Upon completion of the course, the student shall be able to:

- use its knowledge in high resolving mass spectrometry (HRMS) with focus on analytical chemistry to solve analytical questions in the field of biology, veterinary and human medicine (molecular diagnostics).
- motivate the choice of suitable combinations of sample preparation, chromatographic or electrophoretic separation and MS detection in order to solve analytical problems.
- apply multivariate data analysis and bioinformatic tools for solving analytical problems.
- explain the role of MS as an analytical tool for solving biological questions with different principles of imaging.
- perform experimental work with the most essential separation and analytical methods for biology and molecular diagnostics as well as account for and present achieved results in a scientific format.

## **Content**

Overview of modern instrumentation for high resolution mass spectrometry including Fourier-transform ion cyclotron resonance mass spectrometry (FTICR), Orbitrap MS and Imaging MS. Emphasis is placed on the conditions and opportunities offered for different combinations of separation techniques, imaging techniques and mass spectrometry, with both qualitative and quantitative analytical aspects. Computational tools related to the questions are to be addressed.

## **Instructions**

The teaching is given as lectures, classes, group projects, experimental work, demonstrations, seminars and communication training (oral and written).

Course start, laborations and communication training are mandatory

## **Assessment methods and criteria**

Written examination (5 hp). The laboratory experiments and communication training represents 5 hp. The final grade corresponds to a weighted average of the written examination and the laboratory results.

## **Reading List**

- Rolf Ekman (Editor), Jerzy Silberring (Editor), Ann M. Westman-Brinkmalm (Editor), Agnieszka Kraj, Dominic M. Desiderio, Nico M. Nibbering. *Mass Spectrometry: Instrumentation, Interpretation, and Applications*. ISBN: 978-0-471-71395-1
- Edmond de Hoffmann, Vincent Stroobant. *Mass Spectrometry: Principles and Applications*, 3rd Edition. ISBN: 978-0-470-03310-4
- Compendia and relevant scientific reviews.