

Mass Spectrometry

Masspektrometri

5 credits

5 högskolepoäng

Ladok Code: FRRFT01

Version: 1.0

Established by: The Research education committee in Resource Recovery 2020-08-19

Valid from: Autumn 2020

Education Cycle: Third cycle

Research Subject: Resource Recovery

Prerequisites: The student meets the admission requirements for the master's program in resource recovery (or equivalent).

Grading Scale: Fail (U) or Pass (G)

Content

The course aims to give the doctoral student a detailed theoretical knowledge in mass spectrometry. The course begins with addressing the basics of mass spectrometry. Following this is the principles behind mass spectrometry in terms of ionization, isotopes, mass spectrum, handling and different types of MS instruments. Students also gain practical experience when they perform analyzes on a gas chromatograph with a mass spectrometer (GC-MS). By giving doctoral students knowledge of mass spectrometry and its theory together with practical experience to perform analyzes with a GC-MS, they get a new tool to use in their research and also in their future careers.

Learning Outcomes

After completing the course, the student should be able to:

1 *Knowledge and understanding*

- 1.1 Explain the theory behind mass spectrometry.
- 1.2 Describe how ionization of molecules can take place.
- 1.3 Explain how a mass spectrum should be used to identify unknown components.
- 1.4 Explain how quantitative and qualitative analysis can be performed with a GC-MS.
- 1.5 Describe different types of MS instruments and their function.

2 *Skills and abilities*

- 2.1 Be able to perform quantitative and qualitative analyzes with GC-MS.
- 2.2 Discuss the connections between MS analysis in different research areas and how it can be applied in their own research.

3 *Valuation and approach*

- 3.1 Discuss the use of mass spectrometry in different research areas.

Forms of Teaching

The teaching is conducted by seminars held by individual doctoral students and subsequent active discussions between all participants. The doctoral students must also perform quantitative and qualitative analysis of suitable samples from their own research projects with the help of a GC-MS, which is reported in a project report.

The language of instruction is English.

Forms of Examination

Examination of the course occurs through:

- Seminars (Learning Objective 1.1 -1.5, 2.2, 3.1) 4 Grading scale: UG

- Project (Learning Objective 1.4, 2.1- 2.2, 3.1) 1 Grading scale: UG

The course grade given is Fail (U) or Pass (G), where the grade Pass requires active participation and understanding of all course components and well-executed project.

If the student has received a decision/recommendation regarding special pedagogical support from the University of Borås due to disability or special needs, the examiner has the right to make accommodations when it comes to examination. The examiner must, based on the objectives of the course syllabus, determine whether the examination can be adapted in accordance with the decision/recommendation.

Student rights and obligations at examination are in accordance with guidelines and rules for the University of Borås.

Literature and Other Teaching Methods

Gross, Jürgen H. (2017), Mass Spectrometry – A Textbook, Springer
Distributed material

Student Influence and Evaluation

The course is evaluated in accordance with current guidelines for course evaluations at the University of Borås, where the students' views must be obtained. The course evaluation report is published and feedback is given to participating and prospective students in accordance with the above-mentioned guidelines, and forms the basis for future development of courses and educational programs. The teacher responsible for the course is responsible for that the evaluation is carried out as described above.

Miscellaneous

This course is primarily intended for students admitted to the doctoral program Resource Recovery.