| **Department of Molecular Sciences**[Any additional text, e.g, the name of the author] | **COURSE SYLLABUS** SLU ID: SLU.[Enter registry number]12/02/2024 |
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**Course syllabus – doctoral education**

**Course title in English**

Hands-on metabolomics

**Number of higher education credits**

5

**Subject**

Chemistry

**Language of education**

English

**Entry requirements**

PhD students within the SLU Graduate School Focus on Food and Biomaterials are prioritized, but the course will be open for other PhD students and researchers if space allows.

The course does not require any previous experience in metabolomics.

**Learning outcomes**

After completing the course, the students shall be able to:

* Describe the workflow in metabolomics analysis
* Describe advantages and disadvantages of different analytical methods used in metabolomics
* Describe the workflow for data processing in metabolomics
* Describe different statistical methods used in metabolomics
* Know the availability of different open access data bases in the field of metabolomics

**Objectives and content**

The course gives an overview about hands-on experimental approaches used in metabolomics (e.g., sample preparation, data collection, data processing, statistics, and results interpretation). The main objective is to provide students with knowledge about metabolomics by nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry (MS). The course is focused on metabolomics applications and methods but gives a brief introduction to the basic principles of NMR and MS.

The course includes lectures, workshops, a mini-symposium, and a project-based literature exercise.

The lectures will cover basic principles of NMR and MS, metabolomics application areas, available open access resources, and workflows for NMR- and MS-based metabolomics (sample preparation, data collection, data processing, statistics, and result interpretation).

One workshop will focus on NMR-based metabolomics and the other on MS-based metabolomics. Each workshop starts with a demonstration of research facilities followed by a practical training session.

The mini-symposium will include presentations from invited speakers, which will share their metabolomics research.

The literature-based project exercise progresses during the entire course and should be related to a research project where the PhD student is involved. The student defines the project and identifies a suitable metabolomics workflow under supervision. The project is finally presented in a written report and at a seminar.

Attendance at all scheduled activities is obligatory.

**Pedagogical form**

Lectures, workshops, mini-symposium, project-based literature project exercise, final seminar.

Learning outcomes are practiced during the project-based literature exercise and the final seminar.

**Time table**

The course extends over two weeks (full time) and will include scheduled activities such as lectures, workshops and mini-symposium. In addition, a project-based literature project exercise will extend over the entire course, ending with a seminar where the students present the outcomes of the projects.

**Examination**

Attendance at all scheduled activities and approved individual report project.

**Contact for application and further information – name and e-mail address**

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