



Sveriges lantbruksuniversitet  
Swedish University of Agricultural Sciences

Department of Molecular Sciences

**COURSE SYLLABUS**

2023-06-14

## Course syllabus – doctoral education

### Course title in English and Swedish

Applied biomolecular NMR spectroscopy

Tillämpad biomolekylär NMR-spektroskopi

### Number of higher education credits

3

### Subject

Chemistry

### Language of education

English

### Entry requirements

The course is primarily intended for PhD students within the SLU Graduate School Focus on Food and Biomaterials, but will be open for other interested PhD students and researchers if space allows.

The course does not require any previous experience in NMR spectroscopy.

### Learning outcomes

After completing the course the student shall be able to:

- Propose suitable strategies to analyze a given sample by NMR spectroscopy.
- Perform simple NMR experiments under supervision.
- Discuss NMR strategies that are brought up in the course in relation to possible applications from his/her own research projects.

## **Objectives and content**

The course gives an overview about NMR strategies that can be performed on biomolecules, such as proteins, peptides, carbohydrates, lipids, and small metabolites. The main objective is to provide the students with knowledge about possibilities and limitations with NMR spectroscopy. The course is focused on the practical performance and outcome of NMR experiments and just gives a very brief introduction to the theoretical principals.

The course is divided into two modules: A theoretical overview of NMR applications for different biomolecules and then practical exercises in the NMR lab.

The first module includes lectures in NMR applications on proteins, peptides, carbohydrates, nucleic acids, lipids and small metabolites by experts in the different areas. It also contains a brief introduction to semi-solid (HR-MAS) and solid-state (CP-MAS) NMR.

The second module is based on a short NMR project that should be related to a research project where the PhD student is involved. The student defines the project and prepares samples as well as NMR experiments 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, practical demonstration, project-based laboratory exercise, and a final seminar. Learning outcomes are practiced during the laboratory exercise and the seminar.

## **Time table**

The course extends over two weeks with lectures in the mornings and practical training in the afternoons. In total eight lectures will be given and the NMR project starts with a demonstration of the NMR facility followed by preparation for the projects. Each student has 3 hours of NMR time for the project. An introduction to processing of the NMR data is given during the second week and the course ends with a seminar where the students present the outcomes of the projects.

## **Examination**

Attendance at all scheduled activities and approved individual report on the NMR project.

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

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