

## Proteomics and Metabolomics

Title	Proteomics and Metabolomics
Semester	E2023
Master programme in	Chemical Biology / Molecular Health Science / Physics and Scientific Modelling
Type of activity	Laboratory Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at <a href="https://ruc.dk">ruc.dk</a>  Læs mere om uddannelsen og find din studieordning på <a href="https://ruc.dk">ruc.dk</a>

### REGISTRATION AND STUDY ADMINISTRATIVE

Registration	<p>Sign up for study activities at <a href="#">stads selvbetjening</a> within the announced registration period, as you can see on the <a href="#">Studyadministration homepage</a>.</p> <p>When signing up for study activities, please be aware of potential conflicts between study activities or exam dates.</p> <p>The planning of activities at Roskilde University is based on the recommended study programs which do not overlap. However, if you choose optional courses and/or study plans that goes beyond the recommended study programs, an overlap of lectures or exam dates may occur depending on which courses you choose.</p>
Number of participants	The Master Programme/Institute reserves the right to cancel the course if fewer than 8 studentes are registered for the course.
ECTS	5
Responsible for the activity	Biljana Mojsoska ( <a href="mailto:biljana@ruc.dk">biljana@ruc.dk</a> ) Anders Malmendal ( <a href="mailto:amalm@ruc.dk">amalm@ruc.dk</a> )
Head of study	Anders Malmendal ( <a href="mailto:amalm@ruc.dk">amalm@ruc.dk</a> )
Teachers	
Study administration	INM Registration & Exams ( <a href="mailto:inm-exams@ruc.dk">inm-exams@ruc.dk</a> )
Exam code(s)	U60046

### ACADEMIC CONTENT

Overall objective	<p>Proteomics and metabolomics are used to profile large numbers of proteins and small molecule metabolites, respectively, within a cell, tissue, organ, or organism. This provides an overview of which biochemical processes that are affected and can provide new biological insights and unravel new hypotheses. These methods represent a shift in paradigm from hypothesis-driven studies where only one or a few compounds are measured. The aim of this course is to teach the students the principles of proteomics and metabolomics by mass spectrometry (MS) and NMR, and to make them acquainted with the practical steps involved in both types of analyses.</p>
Detailed description of content	<p>The overall content of the course covers principles of proteomics and metabolomics by mass spectrometry and NMR.</p> <p>The students will be introduced to the following topics:</p> <ul style="list-style-type: none"> <li>• 1) MS applications and introduction to proteomics</li> <li>• 2) Sample preparation and LC-MS theory</li> <li>• 3) Fragmentation + Exercises</li> <li>• 4) Introduction to proteomic data analysis</li> <li>• 5) Analyze your own data</li> <li>• 6) NMR applications and introduction to Metabolomics</li> <li>• 7) Introduction to metabolomic data analysis</li> <li>• 8) Analyze your own data</li> </ul>
Course material and Reading list	<p>Pensum in this course are lecture notes and articles provided during the course.</p>
Overall plan and expected work effort	<ul style="list-style-type: none"> <li>• Lectures: 14 hours</li> <li>• Preparation: 28 hours</li> <li>• Experiments sessions: 28 hours</li> <li>• Experimental evaluation and report writing: 40 hours</li> <li>• Exam: 25 hours</li> </ul> <p>- Total for this 5 ECTS course is 135 hours</p>
Format	
Evaluation and feedback	<p>The course includes formative evaluation based on dialogue between the students and the teacher(s).</p> <p>Students are expected to provide constructive critique, feedback and viewpoints during the course if it is needed for the course to have better quality. Every other year at the end of the course, there will also be an evaluation through a questionnaire in SurveyXact. The Study Board will handle all evaluations along with any comments from the course responsible teacher.</p> <p>Furthermore, students can, in accordance with RUCs 'feel free to state your views' strategy through their representatives at the study board, send evaluations, comments or insights from the course to the study board during or after the course.</p>
Programme	<p>During the course there will be a series of lectures describing theoretical and practical aspects of proteomics and metabolomics.</p>

In parallel with this there will be a number of experimental sessions where samples will be prepared, experiments carried out and analysed, and biological conclusions being made.

At the end of the course, groups of students will write manuscript-like reports based on experiments carried out during the course.

## ASSESSMENT

Overall learning outcomes

After completing the course the student will be able to:

- account for essential aspects of the techniques used in proteomics and metabolomics
- perform simple metabolomic and proteomic experiments
- prepare samples for preparation metabolomics and proteomics
- analyse and interpret metabolomic and proteomic data
- apply those methods to solve unfamiliar problems.

Form of examination

Individual written portfolio and oral exam

The character limit of the portfolio is 12,000-36,000 characters, including spaces. Examples of written products are exercise responses, talking points for presentations, written feedback, reflections, written assignments. The preparation of the products may be subject to time limits.

The character limits include the cover, table of contents, bibliography, figures and other illustrations, but exclude any appendices.

Time allowed for exam including time used for assessment: 30 minutes. The assessment is an overall assessment of the written product(s) and the subsequent oral examination.

Permitted support and preparation materials for the oral exam: Personal notes, own reports and assignments.

Assessment: Pass/Fail.

Moderation: Internal co-assessor

Form of Re-examination

Samme som ordinær eksamen / same form as ordinary exam

Type of examination in special cases

Examination and assessment criteria

Groups of students will write manuscript-like reports based on experiments carried out during the course. The individual oral exam will start with a presentation of the results described in the report.

The assessment criteria regarding the written part:

- Account for essential aspects of the techniques used in proteomics and metabolomics
- Describe simple metabolomic and proteomic experiments
- Describe samples for preparation metabolomics and proteomics
- Analyse and interpret metabolomic and proteomic data
- Apply those methods to solve unfamiliar problems

The assessment of the oral exam is based on the student's ability to meet the criteria mentioned above and their ability to

- clearly present and communicate the scientific content of the report
- engage in a scientific dialogue and discussion with the assessors

Furthermore, whether the performance meets all formal requirements

The character limit of the portfolio is 12,000-36,000 characters, including spaces. The preparation of the products may be subject to time limits.

The character limits include the cover, table of contents, bibliography, figures and other illustrations, but exclude any appendices.

Exam code(s)      Exam code(s) : U60046

Course days:

Hold: 1

## Proteomics and Metabolomics (CB)

time	02-10-2023 14:15 til 02-10-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Anders Malmendal ( amalm@ruc.dk )

## Proteomics and Metabolomics (CB)

time	09-10-2023 12:15 til 09-10-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Anders Malmendal ( amalm@ruc.dk )

## Proteomics and Metabolomics (CB)

time	23-10-2023 12:15 til 23-10-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Anders Malmendal ( amalm@ruc.dk )

## Proteomics and Metabolomics (CB)

time	30-10-2023 12:15 til 30-10-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Anders Malmendal ( amalm@ruc.dk )

## Proteomics and Metabolomics (CB)

time	06-11-2023 12:15 til 06-11-2023 14:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB)

time	13-11-2023 14:15 til 13-11-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB)

time	20-11-2023 12:15 til 20-11-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB)

time	27-11-2023 12:15 til 27-11-2023 14:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB)

time	04-12-2023 12:15 til 04-12-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB)

time	07-12-2023 14:15 til 07-12-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Anders Malmendal ( amalm@ruc.dk ) Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB)

time	11-12-2023 12:15 til 11-12-2023 16:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
location	28b.0-05 - lille teorirum (20)
Teacher	Biljana Mojsoska ( biljana@ruc.dk ) Anders Malmendal ( amalm@ruc.dk )

## Proteomics and Metabolomics (CB) - Hand-in of portfolio

time	15-12-2023 10:00 til 15-12-2023 10:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt

## Proteomics and Metabolomics - Exam (CB)

time	21-12-2023 08:15 til 21-12-2023 16:00
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

## Proteomics and Metabolomics (CB) - Hand-in of portfolio (reexam)

time	31-01-2024 10:00 til 31-01-2024 10:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt

## Proteomics and Metabolomics - Reexam (CB)

time	15-02-2024 12:15 til 15-02-2024 20:00
forberedelsesnorm	ikke valgt
forberedelsesnorm D-VIP	ikke valgt
Teacher	Biljana Mojsoska ( biljana@ruc.dk )

