

Roskilde University

MSc. / Cand.scient.

Chemical Biology

Master's Programme



Chemical Biology

Do you want to apply your chemical knowledge in the biotech, health, or pharmaceutical sectors?

Then join our Master's programme in Chemical Biology, where you will gain a chemical perspective on biological processes and learn how to interact with them.

Chemistry is at the root of all biological processes, and in areas ranging from the development and use of medicines for disease management to food safety and sustainability, it all starts with an understanding of the chemical and biological mechanisms at play. The Master's programme in Chemical Biology at RUC lays the foundation for understanding the role chemistry plays in biological processes, and how chemical tools are employed to study, understand, and regulate these processes.

Our profile

In this interdisciplinary programme, you will learn to approach biological questions and problems from a chemical perspective by applying chemical tools, methods, and analyses to study, evaluate and regulate biological systems. We work with the latest scientific discoveries emerging from the field of Chemical Biology, together with advanced experimental methods and instruments. Therefore, you will learn concepts and develop skills at the forefront of areas such as organic chemistry, spectroscopy, eukaryotic cell biology, proteomics, and metabolomics. You will also receive training in good experimental practice (GxP) and data analysis, enabling you to perform high quality experiments and evaluate complex data sets.

After completing of this programme, you will have the knowledge and scientific skills required to make a significant contribution to the development and production of medicines, drug delivery systems, and other health and biotechnology related products. Furthermore, you will develop a practical skillset that enables you to work seamlessly with chemical and biological researchers in their respective laboratory settings.

Specialisations

In this programme, you can choose between three different specialisations:

Chemistry in biological systems	Protein properties & function	Medicinal chemistry
- where you will learn how life works from a chemical perspective and how we can use chemistry to regulate biology.	- where you will learn about the important role proteins play in biological processes and gain an understanding of the factors that govern their function, and how to study and regulate their behaviour.	- where you will learn how drugs are made and how they interact with biological systems.

Master theses and internships

In all three specialisations, you can choose to do a full year experimental master's thesis project, or a shorter master's thesis project in combination with a project-oriented internship in a relevant industrial environment. The master's thesis can cover a wide variety of topics:

- Synthesis of biointeracting compounds
- Green chemistry
- Enzyme catalysis
- NMR characterization of macromolecular structure, dynamics, and interactions
- Functionalized peptoid nanosheets
- Electrochemical measurements
- Proteomics and metabolomics



Photo: Jens Larsen

Example of a study programme

4 th semester	Master Thesis (60 ECTS)					
	or Project-oriented Internship (15 ECTS) and Master thesis (45 ECTS)					
3 rd semester	or Project (15 ECTS) and Master thesis (45 ECTS)					
	Advanced Eukaryotic Cell Biology I - Inside the Cell (5 ECTS)	Good Practices in Experimental Sciences (5 ECTS)	Applied Data Science and Visualisation (5 ECTS)	Elective course (5 ECTS)	Elective course (5 ECTS)	Elective course (5 ECTS)
2 nd semester	Essential Organic Chemistry (10 ECTS)		Applied Spectroscopy (5 ECTS)	Experimental Biotechnology (5 ECTS)	Elective course (5 ECTS)	Course General Molecular and Medical Biology (5 ECTS)
1 st semester						

Please note: The table shows an example of a course of study. Courses, projects, internships and studies abroad with credit transfer may vary for each student.

Elective courses

1 st semester			
Proteomics and metabolomics (5 ECTS)	Genomics and metabolism (5 ECTS)	Advanced chemical methods (5 ECTS)	Pharmacology (5 ECTS)
2 nd semester			
Biophysical chemistry (5 ECTS)	Protein biochemistry (5 ECTS)	Bioinformatics (5 ECTS)	Bioorganic chemistry (5 ECTS)
			Preparation and testing of biopharmaceuticals (5 ECTS)
			Host-pathogen Interactions (5 ECTS)

1st

SEMESTER

The main objective of this semester is to lift you to a higher level of mastery in selected areas of chemistry and molecular biology. There is also room to start your specialization.

2nd

SEMESTER

The main objective of this semester is to let you finish your specialization and prepare you for more independent experimental work. The objective is also to provide you with necessary skills and competences in statistics and data science and how to conduct, plan and validate experimental studies which are competencies in demand by potential employers.

3rd-4th

SEMESTER

The objective of these semesters is to let you work independently with projects of your own choice. You can participate in a project-oriented internship or write a project in the 3rd semester together with a 45 ECTS master's thesis that is also initiated in the 3rd semester.

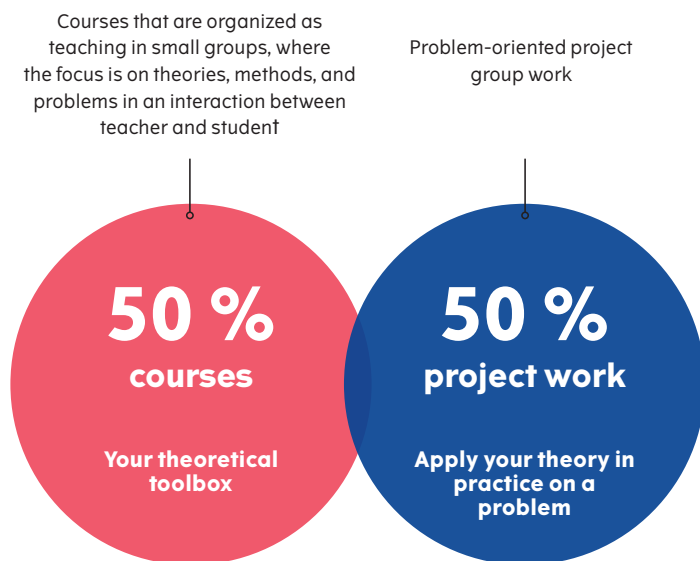
Alternatively, you can choose a 60 ECTS master's thesis that covers the entire second year. If you wish, you can choose a project-oriented internship or a master's thesis with an external supervisor in another academic or industrial environment.

Form of Study

The master's programme has an explicit focus on experimental approaches. This is supported by several experimental courses within the elective and mandatory course portfolio combined with the possibility to carry out a full 60 ECTS experimental master's thesis project. Our courses have relatively small student-numbers ensuring a close and direct dialogue with the teacher and between students.

Through your education, you get the opportunity to create your own individual education profile and your own independent specialization in accordance with the idea of the problem-oriented, interdisciplinary and project-oriented teaching method at Roskilde University.

The study form is a combination of 50 % courses and 50% project work



The project work and guidance are prioritized at Roskilde University. We also prioritize that you gain experience with the production and processing of empirical data as well as the practical application of theories and methods. All master's programmes offer project-oriented internships and / or studies at other universities at home and abroad with credit transfer.

Study environment

As a student in Chemical Biology, you will become part of the Department of Science and Environment, giving you the opportunity to work closely with expert researchers from the disciplines of chemistry, biology, and physics. This interdisciplinarity is uniquely found in the natural sciences programmes at Roskilde University and makes for a vibrant study environment that prepares you for the many professional challenges you will meet in a wide variety of modern companies and research groups.

As Chemical Biology is a relatively small programme, you will have close contact with researchers and supervisors and ample access to state-of-the-art equipment, giving you the perfect setting to pursue your own scientific interests in collaboration with your fellow students. In addition to time spent in the labs and classrooms, you will also have the opportunity to attend events, such as the night café (Natcafé), and participate in activities, such as student organised board game nights.

”
In my job in a small pharmaceutical company, I frequently need to define the right solutions to challenges, as they occur; my ability to quickly gain new knowledge in such situations is a result of the project-oriented approach at RUC.”

Remy Kronbak, QC-chemist, pK Chemicals

Career

As a graduate in Chemical Biology, your academic profile and skill set will be attractive to the pharmaceutical, biotech, health, and food sectors, in which your role could involve research, development, production, and control.

You will have a unique skillset to work in interdisciplinary settings conducting tasks, such as chemical synthesis and analysis, assays, and biophysical characterization. There are career opportunities in the public and private sector, education, and consultancy. Some of our graduates stay at RUC or go to other universities to carry out PhD studies.

Here are some examples of positions held by previous graduates:

- Principal Scientist at CP Kelco, developing nature-based ingredients for the food industry
- Chemist in Quality Control at pK Chemicals, working with production control
- Head of Lipidomics Core Facility at Danish Cancer Society, overseeing lipidomics services to external customers
- Chemist in Quality Assurance at Novo Nordisk, working with process validation

“My studies allowed me to transfer and apply the knowledge from one field to another and understand scientific phenomena on a deeper level. That reflected also on my master thesis work, PhD thesis and it continues to play a role in my current position and as an Associate professor in Chemical Biology.”

Biljana Mojsoska, Associate professor, Roskilde University

Further information



You can find admission requirements, application deadlines and other information about Chemical Biology at Roskilde University here:

ruc.dk/en/master/chemical-biology

Contact us if you have questions about Chemical Biology:

RUC Study & Career Guidance

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