

# Bioinformatics

Title	Bioinformatics
Semester	F2025
Master programme in	Chemical Biology / Mathematical Bioscience / Molecular Health Science
Type of activity	Course
Teaching language	English
Study regulation	Read about the Master Programme and find the Study Regulations at <a href="http://ruc.dk">ruc.dk</a> Læs mere om uddannelsen og find din studieordning på <a href="http://ruc.dk">ruc.dk</a>

## REGISTRATION AND STUDY ADMINISTRATIVE

Sign up for study activities at [stads selvbetjening](#) within the announced registration period, as you can see on the [Studyadministration homepage](#).

When signing up for study activities, please be aware of potential conflicts between study activities or exam dates.

### Registration

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.

Number of participants

ECTS 5

Responsible for the activity

John Shorter ([johnsh@ruc.dk](mailto:johnsh@ruc.dk))

Head of study Lotte Jelsbak ([ljelsbak@ruc.dk](mailto:ljelsbak@ruc.dk))

Teachers

Study administration INM Registration & Exams ([inm-exams@ruc.dk](mailto:inm-exams@ruc.dk))

Exam code(s) U60178

## ACADEMIC CONTENT

Overall objective	<p>The aim is to give the students essential bioinformatics skills on a user level.</p> <p>The course introduces the students to describing bioinformatic problems, selecting bioinformatic methods and solving simple bioinformatic problems using existing tools.</p>
Detailed description of content	<p>The course will introduce the students to describing bioinformatic problems, selecting bioinformatic methods and solving simple bioinformatic problems using existing tools.</p> <p>Each lesson will focus on introducing a different bioinformatic tool to the students so that they will have broad experience across a range of methods needed for their master's research.</p>
Course material and Reading list	<p>All material is available from Moodle via links.</p>
Overall plan and expected work effort	<p>The course is composed of 8 lessons. Each lesson is concluded with a written lesson report. The lesson reports demonstrate the students active participation. The lesson reports can be written individually or in groups of 2-3 students. The final mini project report is written in groups of 2-3 students.</p> <ul style="list-style-type: none"> <li>• lectures 8 hrs</li> <li>• pc lab practical exercises 24 hrs</li> <li>• preparation for lectures and exercises 38 hrs</li> <li>• problem solution and report writing 65 hrs</li> </ul> <p>total 135 hrs</p>
Format	<p>The course includes formative evaluation based on dialogue between the students and the teacher(s).</p>
Evaluation and feedback	<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</p>

handle all evaluations along with any comments from the course responsible teacher.

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.

Most classes will begin with a short lecture / introduction to a new bioinformatics concept followed by time for discussion and work with exercises.

Students will then work in pairs to analyze genomics data based on concepts covered in the introduction. Selected groups will then present their data analysis to the class.

The students will write a report for each genomics data set where an emphasis should be on explaining the analyses used, and the implication of the results.

#### Programme

These reports will be turned in at the end of the class, or before the next class, with the names of the group members along with code used for the problem.

The topic for mini-project is to present a bioinformatics analysis of an approved dataset. You will use what you learned during the semester to analyze biological data, which may reflect real data used in the student's Masters project, and students will present this analysis and script at the last class.

You are expected to bring a laptop computer to class.

#### ASSESSMENT

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

Overall learning outcomes

- formulate a biological research problem so that it can be analysed from a bioinformatic perspective
- explain the opportunities and limitations in certain databases and programs

- search relevant databases
- search and select programs to solve bioinformatic problems
- use online programs and download, install and use local programs
- analyse a bioinformatic problem and select a solution
- solve simple bioinformatic problems
- communicate competently with bioinformaticians about more complex problems
- analyse complex data structures with relevant mathematical and statistical models/programs.

Active, regular attendance, and satisfactory participation

Active participation is defined as:

The student must participate in course-related activities (e.g., workshops, seminars, field excursions, process study groups, working conferences, supervision groups, and feedback sessions).

Form of examination

Regular attendance is defined as:

- The student must be present for a minimum of 75 percent of the lessons.

Satisfactory participation is defined as:

- e.g., oral presentations (individually or in a group), peer reviews, mini projects, tests, and planning of a course session.

Assessment: Pass/Fail

Individual written take-home assignment

The character limit of the assignment is: 2,400-19,200 characters, including spaces.

The character limit includes the cover, table of contents, bibliography, figures and other illustrations, but exclude appendices.

Form of Re-examination

The duration of the take-home assignment is 7 days and may include weekends and public holidays.

Assessment: Pass/Fail

Type of  
examination  
in special  
cases

Exam: Participate actively is defined as: The student must participate actively in lectures, discussion and problem solving classes. Students may be selected to present their report to the class at the end of a lecture. Active participation means students must work on bioinformatics analysis during the class and present if they are called upon.

Regular attendance is defined as: The student must be present for minimum of 75 percent of the lessons. This includes arriving on-time and staying until the end of the class.

Satisfactory participation is defined as: The student must write and submit reports (usually a PowerPoint presentation) following every class. The student must work on a mini-project and present results at the final class.

Examination  
and  
assessment  
criteria

Assessment criteria in relation to satisfactory participation of the exercises and mini-project, students will be assessed by their ability to: - Formulate a biological research problem so that it can be analysed from a bioinformatic perspective - Explain and argue for the selection of program(s), data, databases, and settings used for this analysis - Identify and discuss the in strengths and weakness of the completed analysis - Clearly present and communicate the scientific content of the final mini-project

Reexam:

Assessment criteria in relation to the re-exam, students will be assessed by their ability to:

- Formulate a biological research problem so that it can be analysed from a bioinformatic perspective
- Explain and argue for the selection of program(s), data, databases, and settings used for this analysis
- Identify and discuss the in strengths and weakness of the completed analysis
- Clearly present and communicate the scientific content of the final written reexam report

Exam code(s) Exam code(s) : U60178

## **Course days:**

**Hold: 1**

### **Bioinformatics (MHS, CB)**

time 02-04-2025 12:15 til  
02-04-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 14-04-2025 12:15 til  
14-04-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 16-04-2025 12:15 til  
16-04-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 23-04-2025 12:15 til  
23-04-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 30-04-2025 12:15 til  
30-04-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 07-05-2025 12:15 til  
07-05-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 14-05-2025 12:15 til  
14-05-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics (MHS, CB)**

time 28-05-2025 12:15 til  
28-05-2025 16:00

location 22.1-009 - undervisningslokale (72)

Teacher John Shorter ( johnsh@ruc.dk )

### **Bioinformatics - Reexam, take-home assignment**

time 23-06-2025 10:00 til  
30-06-2025 10:00

forberedelsesnorm ikke valgt

forberedelsesnorm D-VIP ikke valgt