

Recommended plan of study

About the course

subject

Mathematical Bioscience

Recommended
Study Plan

Read about the Master Programme and find the Study Regulations at ruc.dk

If you have any questions regarding study planning, available courses etc. please contact the study administration at inm-exams@ruc.dk

List of courses/projects offered in the Autumn 2023

Mandatory activities:

Mandatory activities - first semester

- Modelling of Biological Systems (10 ECTS)
- General Molecular and Medical Biology (5 ECTS)
- Modelling project (15 ECTS)

Mandatory activities - third semester

- Differential Geometry (5 ECTS)
- Specialisation Project **or** Project-oriented Internship (15 ECTS)

Elective courses - Third semester:

Students can on the third semester choose between the offered elective courses. The students also have the opportunity, as part of the elective courses, to choose between three thematic profiles, each consisting of four pre-appointed courses.

Please find information regarding thematic profiles and the programme's structure below.

- Nutrition Biology (Seminar Course in Molecular Health Science) (5 ECTS)
- Cancer Biology (Seminar Course in Molecular Health Science) (5 ECTS)
- Sustainable use of Biological Systems (5 ECTS)
- Pharmacology (5 ECTS)

List of courses/projects offered in the Spring 2024

Mandatory courses:

- Dynamical Systems Analysis (5 ECTS)
- Probability and Statistics (5 ECTS)
- Fundamental Mathematical Structures **or** Scientific Computing and Data Science (10 ECTS)

Elective courses - Second semester:

Students can on the second semester choose between the offered elective courses. The students also have the opportunity, as part of the elective courses, to choose between three thematic profiles, each consisting of four pre-appointed courses.

Please find information regarding thematic profiles and the programme's structure below.

- Bioinformatics (5 ECTS)
- Applied Data Science and Visualisation (5 ECTS)
- **cancelled** Environment and Health (5 ECTS)
- Molecular Methods in Ecology (5 ECTS)
- Advanced Eukaryotic Cell Biology I (5 ECTS)

Other study activities available:

- Project Management (5 ECTS)
- Modelling project (15 ECTS)
- Specialisation Project (15 ECTS)

- Project-oriented Internship (15 ECTS)

Course days:

Hold: 1

The programme's structure (click to read more)

time 01-02-2024 00:00 til
01-02-2024 00:00

forberedelsesnorm ikke valgt

forberedelsesnorm ikke valgt
D-VIP

Content

First semester

Objective

The overall objective is to give an introduction to mathematical modelling of biological systems. In the course 'Modelling of biological systems' standard models are analysed mathematically and one basis of the underlying biological mechanisms. The modelling and analysis competencies are trained further in the semester project.

Mandatory study activities (total of 30 ECTS)

- Modelling of Biological Systems (10 ECTS)
- General Molecular and Medical Biology (5 ECTS)
- Modelling Project (15 ECTS)

Second semester

Objective

The overall objective in this semester is to give the student an understanding of the different methodologies used in biology and in mathematics. Through various courses and 'Dynamical system analysis' and 'Probability and Statistics' the student will see examples of the biologist's, the statistician's, and the mathematician's logic, reasoning, formalism, and scientific methodology.

In the thematic profile **“Mathematical Bioscience with Scientific Computing”** the student will develop computational knowledge and numeric skills in scientific computing and data science and as well as acquiring methods in bioinformatics and advanced data analysis, statistics and probability theory.

In the thematic profile **“Mathematical Environmental Bioscience”** the student will develop computational knowledge and numeric skills in scientific computing as well as acquiring methods in ecology to be able to specialise in mathematical modelling of biological macroscopic eco-systems.

In the thematic profile **“Mathematical Bioscience of Diseases”** the student will develop computational knowledge and numeric skills in scientific computing and data science and as well as acquiring methods in bioinformatics and be able to specialise in mathematical modelling of human diseases, cancer, and epidemics.

Mandatory study activities (total of 20 ECTS)

- Dynamical Systems Analysis (5 ECTS)
- Probability and Statistics (5 ECTS)
- Fundamental Mathematical Structures or Scientific Computing and Data Science (10 ECTS)

Elective study activities (total of 10 ECTS)

- Bioinformatics (5 ECTS)
- Applied Data Science and Visualisation (5 ECTS)
- Environment and Health (5 ECTS)
- Molecular Methods in Ecology (5 ECTS)
- Advanced Eukaryotic Cell Biology I (5 ECTS)

Each semester, the board of studies approves a number of biology courses from Molecular Health Science, Chemical Biology or Environmental Science for students to choose from. Please note that the offering of the specialisation courses is depending on the total number of course registrations.

Third semester

Objective

The overall objective in this semester is student's further specialisation. This is realized through the 15 ECTS specialisation project or the project-oriented internship. Also, the course 'Parameter estimation' focuses on advanced specialised methods in the analysis of model parametrisation. This semester also acts as preparation for the Master thesis semester.

Mandatory study activities (25 ECTS)

- Parameter Estimation (5 ECTS)
- Differential Geometry (5 ECTS)
- Specialisation Project or Project-oriented Internship (15 ECTS)

Elective study activities (5 ECTS)

- Seminar course in Molecular Health Science (5 ECTS)
- Sustainable use of biological systems (5 ECTS)
- Pharmacology (5 ECTS)

Each semester, the board of studies approves a number of biology courses from Molecular Health Science, Chemical Biology or Environmental Science for students to choose from. Please note that the offering of the specialisation courses is depending on the total number of course registrations.

Fourth semester - Master Thesis

Objective

In the master thesis the objective is that the student show the ability to apply the skills, knowledge, and competencies obtained in the programme to independently, formulate a current research question/hypothesis in the field of mathematical bioscience. The student can investigate the problem by, for example, perform laboratory experiments and analyse the data both statistically and through existing models, design new mathematical models based on existing data, and/or formulate novel and original methods to analyse data and models.

Mandatory study activities

- Master thesis (30 ECTS)