



FACULTY OF SCIENCE

Programme sheet

Master Programme in Computational Science, Life Sciences, 120 credits

September 2026 – June 2028

Computations are becoming more and more important in research and industry. To make predictions, analysis or to replace experiments, we make use of numerical simulations and machine learning on large computers. We generate and store large amounts of data and use data science to search for patterns, connections, and trends.

The Master Programme in Computational Science with specialisation in Life Sciences will give you detailed knowledge about the underlying computational methods used in medical applications and in cell biology. You will learn how to study complex processes in natural sciences, and how Computational Science can contribute to knowledge evolution in society. A few of many examples are studies in medical image analysis, cell dynamics and gene regulatory networks. The programme will prepare you for a professional career in academia as well as in business and industry.

Programme overview

This interdisciplinary education will give you leading edge knowledge in the field of computational science. The specialisation has students with a background in mathematics/physics and an interest in medicine and cell dynamics as a target group. In addition to knowledge in theory for computational science, there will be an emphasis on obtaining knowledge about the practical tools that are used by professionals in the field and you will amongst several things train your skills in programming. You will get generic knowledge and skills of importance for computationally intensive working tasks, such as problem formulation, information search, data processing, scientific writing and presentation techniques.

The programme has four separate specialisations: Geoscience, Life Sciences, Physics and Scientific Computing. You will study several courses together with students from another specialisation than your own and there will be opportunities to do common projects and thesis work. During your studies, an interdisciplinary perspective is emphasized and you will also study together with students from biology, geology, environmental sciences, physical geography and chemistry.

The education has a strong connection to research. You will meet and be taught by active and internationally well recognised researchers, and you will be in contact with several research groups. You will at the same time be prepared for a career in business and industry.

Programme structure

Computational Life Sciences is a branch within computational science where analytical, numerical and statistical methods are used to analyse the dynamics of biological systems, as well as huge datasets from experiments. The programme contains a mix of courses in biology, biophysics, mathematics and computational science. You will get broad knowledge in numerical methods within data science, Monte-Carlo simulations and solutions to differential equations, as well as insight to the interplay between computational methods and the underlying models for the biological systems.

Compulsory courses 45 credits

BERN01	Modelling in Computational Science, 7.5 credits
BERN04	Introduction to Artificial Neural Networks and Deep Learning, 7.5 credits
BERN06	Systems Biology – Modelling and Computations, 7.5 credits
BERN08	Theoretical Biophysics, 7.5 credits
BIOA96	Biology of the Cell, 7.5 credits
NUMN32	Numerical Methods for Differential Equations, 7.5 credits

Alternative-compulsory (elective) courses 22.5 credits

At least three of the following courses

BERN02	Reproducible Data Science and Statistical Learning, 7.5 credits
BERN07	Uncertainty Quantification and Data Driven Modelling, 7.5 credits
BERN09	Parallel Programming in Scientific Computing, 7.5 credits

FYST67	Experimental Biophysics, 15 credits
MASM11	Monte Carlo Methods for Statistical Inference, 7.5 credits
MASM22	Linear and Logistic Regression, 7.5 credits
NUMN21	Advanced Course in Numerical Algorithms with Python/SciPy, 7.5 credits
NUMN28	Numerical Simulations of Flow Problems, 7.5 credits
NUMN33	Numerical Methods for Parital Differential Equations, 7.5 credits

Optional courses 22.5 credits

The optional courses are to be chosen from science or medicine.

Degree project 30 credits

BERM09	Computational Science – Life Sciences: Master’s Degree Project
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Table 1 Course of study, example

Year 1	Autumn 1	Autumn 2	Spring 1	Spring 2
	BERN01 Modelling in Computational Science, 7.5 credits	NUMN32 Numerical Methods for Differential Equations, 7.5 credits	BERN08 Theoretical Biophysics, 7.5 credits	NUMN28 Numerical Simulations of Flow Problems, 7.5 credits
	BIOA96 Biology of the Cell, 7.5 credits	BERN04 Introduction to Artificial Neural Networks and Deep Learning, 7.5 credits	NUMN33 Numerical Methods for Parital Differential Equations, 7.5 credits	MASB21 Statistics – Basic course for Applied Computational Science, 7.5 credits
Year 2	Autumn 1	Autumn 2	Spring 1	Spring 2
	NUMN21 Advanced Course in Numerical Analysis with Python/SciPy, 7.5 credits	BERN06 Systems Biology – Models and Computations, 7.5 credits	Degree project 30 credits	
	MASC14 Stationary Stochastic Processes, 7.5 credits	MASM17 Time Series Analysis, 7.5 credits		

Career opportunities

After graduation, there are several different career paths depending on which subject profile you have chosen. The Master's programme gives you a solid ground for postgraduate education in natural sciences. You can also choose a career path outside academia and then find attractive jobs in areas where there is a need to solve computational problems both in industry and in public administration and other organisations.

Requirements and selection

Entry requirements

Bachelor's degree in Physics of at least 180 credits.

Proficiency in English equivalent to English 6/B from Swedish upper-secondary school.

or

Bachelor's degree of at least 180 credits in Science or Engineering. The degree must contain at least 30 credits mathematics, of which 6 credits in programming and 7.5 credits in statistics, and an additional 60 credits in mathematics and/or physics. The degree must contain at least 15 credits in a natural science (not mathematics).

Proficiency in English equivalent to English 6/B from Swedish upper-secondary school.

Selection criteria

Based on grades awarded for previous academic courses, with majors in science, technology and mathematics, as well as a statement of purpose for the application in which applicants state their goals with the programme (from the applicant's "Summary sheet").

Degree

Master of Science

Major: Computational Science with specialisation in Scientific Computing

Naturvetenskaplig masterexamen

Huvudområde: Beräkningsvetenskap med fördjupning i beräkningsmatematik

Application

Apply online using [Universityadmissions.se](https://universityadmissions.se)

Application period: 16 October 2025 - 15 January 2026

Language of instruction: English

Contact

Master coordinator: Patrik Edén compsci@math.lu.se

