FACULTY OF SCIENCE

Programme sheet

Master Programme in Computational Science, Geoscience, 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 Geoscience will give you detailed knowledge about the underlying methods with respect to geoscience. 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, and research on, environment and climate change, global environmental issues and global cycles. 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 geoscience and programming 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 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

Within computational science with geoscience specialisation analytical, numerical and statistical methods are used to analyse and draw conclusions from numerical models, as well as huge datasets from geoscientific experiments. The programme contains a mix of courses in geoscience, mathematics and computational science that will give you broad knowledge in numerical methods within data science, Monte-Carlo simulations and solutions to differential equations. You will also get insight into the interplay between computational methods and the underlying physical phenomena and models that are studied.

Compulsory courses 30 credits

BERN01	Modelling in Computational Science 7.5 credits
BERN03	Introduction to Climate system modelling, 7.5 credits
NUMN21	Advanced Course in Numerical Algorithms with Python, 7.5 credits
NUMN32	Numerical Methods for Differential Equations, 7.5 credits

Alternative-compulsory (elective) courses 45 credits, of which 30 credits in geoscience

NGEA20	Introduction to Hydrology, 15 credits
NGEA21	The Climate System, 15 credits
NGEA04	Ecosystems Analysis, 15 credits
NGEN01	Climate Change and its Impacts on the Environment,

	15 credits
NGEN02	Ecosystem Modelling, 15 credits
NGEN17	Global Ecosystem Dynamics, 15 credits
GEOB21	Livets utveckling och jordens klimat (in Swedish), 15 credits
GEOM20	Methods in Geoscience,15 credits
GEOM22	Quarternary Geology and Landscape Dynamics,15 credits
GEON09	Global Environmental Change from a Geological Perspective, 15 credits
BERN02	Reproducible Data Science and Statistical Learning, 7.5 credits
BERN04	Introduction to Artificial Neural Networks and Deep Learning, 7.5 credits
BERN07	Uncertainty Quantification and Data-driven Modeling, 7.5 credits
BERN09	Parallel Porgramming in Computational Science, 7.5 credits
MASC13	Markov Processes, 7.5 credits
MASC14	Stationary Stochastic Processes, 7.5 credits
MASM11	Monte Carlo Methods for Statistical Inference, 7.5 credits
MASM17	Time Series Analysis, 7.5 credits
MASM22	Linear and Logistic Regression, 7.5 credits
MASM25	Spatial statistics with Image Analysis, 7.5 credits
NUMN26	Simulation Tools, 7.5 credits
NUMN28	Numerical Simulations of Flow Problems, 7.5 credits
NUMN33	Numerical Methods for Partial Differential Equations, 7.5 credits

Optional courses 15 credits

The optional courses are to be chosen from geoscience, computational science, mathematics, mathematical statistics or numerical analysis.

Degree project 30 credits

BERM02	Computational Science – Geoscience: Master’s Degree Project

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	NGEN02 Ecosystem Modelling, 15 credits	GEON09 Global Environmental Change from a Geological Perspective, 15 credits
	NUMN21 Advanced Course in Numerical Algorithms with Python, 7.5 credits	**BERN03** Introduction to Modelling of Climate Systems, 7.5 credits		
Year 2	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**
	MASC14 Stationary Stochastic Processes, 7.5 credits	MASM25 Spatial statistics with image analysis, 7.5 credits	**Degree project 30 credits**	
	BERN02 Reproducible Data Science and Statistical Learning, 7.5 credits	BERN04 Introduction to Artificial Neural Networks and Deep Learning, 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. The degree must contain at least 15 credits in geoscience.

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 geoscience.

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 Geoscience
Naturvetenskaplig masterexamen
Huvudområde: Beräkningsvetenskap med fördjupning i geovetenskap

Application

Apply online using Universityadmissions.se
Application period: 15 October 2025 - 15 January 2026
Language of instruction: English

Contact

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