FACULTY OF SCIENCE

Master Programme in Applied Computational Science, Physical Geography, 120 credits

September 2023 – June 2025

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 Applied Computational Science with specialisation in Physical Geography will give you detailed knowledge about the underlying methods with respect to physical geography. 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. Applied computational science can be divided into several components: mathematics, modelling, statistics, and programming. The borders are not sharp, as concepts and methods often combine these components. 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 in-depth knowledge in the field of computational science, but you also study advanced courses

based on your subject knowledge in natural science from your bachelor's degree. In addition to knowledge of theory of 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 jobs such as problem formulation, information search, data processing, scientific writing, and presentation techniques.

The programme has five separate specialisations: Environmental Science, Biology, Geology, Physical Geography and Chemistry. You will study several courses together with students from another specialisation than your own and there are possibilities to do common projects and thesis work. During your studies, an interdisciplinary perspective is emphasized and you will even study together with students from mathematics and physics.

The education has a strong connection to research. You will meet and be taught by active and internationally well recognized 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

In the first year of the specialisation Physical Geography, you initially study a course on greenhouse gases and biochemical cycles followed by a basic course in mathematics and a course on Ecosystem modelling. In the end of the first year and the first half of the second year you will study general courses in statistics and programming, modelling in computational science, reproducible data science and statistical learning and an introduction to modelling of climate systems. The last semester is reserved for the master's thesis.

Compulsory courses 90 credits

NGEN14	Greenhouse Gases and Biogeochemical Cycles, 15 credits
MATA04	Mathematics for Scientists 2, 15 credits
NGEN02	Ecosystem Modelling, 15 credits
MASB11	Biostatistics, 7.5 credits
NUMA01	Computational Programming with Python, 7.5 credits
BERN01	Modelling in Computational Science, 7.5 credits

BERN02   Reproducible Data Science and Statistical Learning, 7.5 credits

BERN03   Introduction to Modelling of Climate Systems, 7.5 credits

FYTN14   Introduction to Artificial Neural Networks and Deep Learning, 7.5 credits

Degree project 30 credits

BERMXX   Degree project Master of Science, 30 credits

Table 1 Course of Study

Year 1	Autumn 1	Autumn 2	Spring 1	Spring 2
	NGEN14 Greenhouse Gases and Biogeochemical Cycles, 15 credits	**MATA04** Mathematics for Scientists 2, 15 credits	**NGEN02** Ecosystem Modelling, 15 credits	**MASB11** Biostatistics, 7.5 credits
				NUMA01 Computational Programming with Python, 7.5 credits

Year 2	Autumn 1	Autumn 2	Spring 1	Spring 2
	BERN01 Modelling in Computational Science, 7.5 credits	**BERN03** Introduction to Modelling of Climate Systems, 7.5 credits	**Degree project Master of Science, 30 credits**	
	BERN02 Reproducible Data Science and Statistical Learning, 7.5 credits	**FYTN14** 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 of at least 180 credits, including 90 credits in science of which 15 credits should be in mathematics.
Proficiency in English equivalent to English 6/B from Swedish upper-secondary school.

Selection criteria
Seats are allocated according to: Previous college/university studies (HPAV): 100 %.

Degree

Master of Science
Major: Applied Computational Science with specialisation in Physical Geography
Naturvetenskaplig masterexamen
Huvudområde: Tillämpad beräkningsvetenskap med fördjupning i naturgeografi

Application

Apply online using Universityadmissions.se
Application period: 17 October 2022 - 16 January 2023
Language of instruction: English

Contact

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