DATA SCIENCE

Specialized Master's degree program
Master of Science: M Sc in Data Science

Data science combines mathematics, statistics, computer science, and engineering to extract knowledge from data, support evidence based decision making, and build adaptive systems that learn from experience. Over the past decade it has become indispensable in domains as diverse as pharmaceutical research and development, medical imaging, computational social science, digital humanities, and public policy.

Today's wave of «generative AI»—especially large language models and diffusion models—has amplified that impact: LLM (=Large Language Model) powered assistants summarise medical literature in seconds, protein folding networks accelerate drug discovery, and foundation model surrogates speed up climate simulations. These advances illustrate the «unreasonable effectiveness» of data driven methods and are reshaping legal frameworks, public debate, and the very ways we work, think, and communicate.

A typical data science workflow starts with exploratory analysis and data cleaning, progresses through modelling and scalable computation, and culminates in clear visualisation and communication of new knowledge. Because of its sweeping importance, data science is often called the «fourth pillar» of scientific inquiry, standing alongside theory, experiment, and computational science.

Focal area of teaching and research

The MSc in Data Science at the University of Basel offers a rigorous foundation in mathematics, statistics, and machine learning together with a full repertoire of modern systems courses for secure, efficient handling of large scale data.

Key features

- Integrated AI & LLM track – new modules on AI, generative modelling, and foundation models complement the existing machine learning core.
- AI for Science electives – choose from courses ranging from computational biology to psychology that demonstrate how data science drives discovery.
- Scalable systems training – hands on work with distributed databases, clusters, and GPU accelerators housed in sciCORE—University of Basel's high-performance computing facility.
- Research immersion – through the University's Center for Data Analytics you can write your Master's thesis on real world data drawn from life sciences, fintech, humanities, or physics, supervised by internationally recognised faculty.

The two year, 120 ECTS programme culminates in the degree Master of Science in Data Science, and provides an ideal springboard to PhD study in Data Science, Computer Science, or Mathematics, or to leadership roles in academia.

Course structure Master studies

The Master of Science degree is the postgraduate degree after the Bachelor's programme. The program awards 120 ECTS credits in total. The Specialized Master's degree program Data Science is a so called «mono-course» consisting of only one core subject.

Curriculum Master's degree Data Science	CP
Mathematical Foundations	at least 18
Machine Learning Foundations	at least 18
Systems Foundations	at least 18
Electives in Data Science	20
Preparation of the Master's thesis	6
Master's thesis	30
Total	120

One ECTS credit point roughly equals 30 hours of study.

Course language

The language of instruction is English. The Master's thesis is generally to be written in English.

Exams

Student performance is assessed through course accompanying certificates, proof of course participation according to study contract, a Master's thesis and through a Master's examination.

Language stays / Internships

No language stays or internships are required.

Combination of subjects

The degree programs at the Faculty of Science are generally mono-courses with the possible addition of an in-depth subject and an elective subject.

Start of program

The Master's program Data Science can be started in the fall or the spring semester. However, due to the sequence of the courses to be attended, a start in the fall semester is highly recommended.

Duration of study

The Master's program lasts four semesters. There are no restrictions on the duration of study. Part-time studying resulting in a longer study time is possible (upon request).

Further degrees

Doctorate: The Master of Science in Data Science qualifies for a PhD in Computer Science or Mathematics in particular in the context of the PhD Program Data Science at the Department of Mathematics and Computer Science. Transfaculty doctorates are possible in any of the computation- or data-oriented programs at the University of Basel, for example in genomics, chemistry, or neuroscience. The doctoral studies last three to four years. After the acceptance of the dissertation an oral examination covering the postgraduate studies in the doctoral subject has to be passed.

Career opportunities

With an MSc in Data Science—and, if desired, a subsequent doctorate—you are exceptionally well positioned for high impact roles such as

- AI research scientist in pharma, biotech, or chemicals
- LLM product engineer in fintech, e commerce, or media

- Data platform architect for health tech, automotive, or smart manufacturing companies
- Quantitative analyst in banking, insurance, or hedge fund management
- Policy advisor using data driven evidence in government or NGOs

Demand for experts who can marry rigorous fundamentals with generative AI know how far outstrips supply, making data scientists among the most sought after and best paid professionals worldwide.

Admission

Direct admission to the Specialized Master's degree program Data Science requires a Bachelor's degree, in Mathematics, Computer Science or Computational Sciences, of 180 CP with a final grade of 5.0 or better (Swiss grading system 1 to 6, where 6 = max./4 = pass), obtained at a university recognized by the University of Basel.

For applicants having no average grade for their Bachelor's degree, the Curriculum Committee Data Science will assess the equivalence to an average grade of 5.0.

For admission without additional requirements and/or conditions, applicants must provide evidence of knowledge in Mathematics and Computer Science of at least 90 CP from the following areas:

- Analysis, Linear Algebra, Discrete Mathematics (≥ 20 CP)
- Numerical Analysis (≥ 4 CP)
- Probability & Statistics (≥ 8 CP)
- Programming (≥ 12 CP)
- Algorithms & Data Structures (≥ 8 CP)
- Databases (≥ 6 CP)
- Scientific Computing & Pattern Recognition (≥ 12 CP)
- Scientific Communication (≥ 3 CP).

Comparable qualifications from other recognised universities are evaluated individually by the curriculum committee.

If the requirements are only partly met, the curriculum committee can suggest admission requirements, which are defined by the Rectorate upon request of the Examination Board of the Faculty of Science.

For Bachelor's degrees that do not have a grade or grade average, the equivalence of the grade to the average grade of at least 5.0 (Swiss grading system 1 to 6, where 6 = max./4 = pass) will be reviewed by the examination commission. Any study requirements to be fulfilled as conditions and/or stipulations must not exceed a total of 30 CP; otherwise, admission will be denied.

Further information and regulations can be found in the study regulation and the study program for the Master's degree program Data Science: https://dmi.unibas.ch/de/studium/data-science

Binding information under: https://unibas.ch/admission

Application

Application under https://unibas.ch/application; the application fee amounts to CHF 100.-. Application deadline for the fall semester is April 30th for the spring semester November 30th. Students of the University of Basel see: https://unibas.ch/rueckmeldung

Enrollment

The letter of admission also informs students on the procedure of enrollment. In general, students with a Swiss educational background do not have to be present in person for enrollment.

Tuition fees and scholarships

Tuition fees per semester (also for examination semesters): CHF 850.-
Individual costs of living etc. are not included.

Scholarships and student loans: Applications should be sent to the responsible office of the canton in which the parents are eligible to pay their taxes. No support is available by the course organizers.

Mobility

Semesters abroad are possible and supported by scholarship programs. The mobility programs facilitate the stay at other Swiss universities or foreign universities. Further Information: Student Exchange, Petersplatz 1, 4001 Basel, T +41 61 207 30 28, mobility@unibas.ch, https://unibas.ch/mobility

Further information

Further information concerning the studies

General information, including the guidelines of the Master of Science in Data Science can be found at: https://dmi.unibas.ch/de/studium/data-science/

Information about the University of Basel

- The course directory («Vorlesungsverzeichnis») can be found at: https://unibas.ch/vv
- Basler Studienführer: https://studienberatung.unibas.ch
- Homepage: https://unibas.ch

Student advice

Questions regarding the studies of Data Science can be discussed with the study coordination of the Master's program Stefanie Burgahn (T +41 61 207 39 94, stefanie.burgahn@unibas.ch).

Contacts

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