DATA SCIENCE

Specialized Master's degree program
Master of Science: MSc in Data Science

Data Science is a modern and interdisciplinary field of research. It is located at the interface between Mathematics and Statistics, Computer Science and Programming. Data Science is extensively applied in various occupational fields ranging from a classical academic career across industry to politics and health care. Nowadays, more and more huge volumes of data sets ("Big Data") are generated. Therefore, Data Science applies a large variety of different methods like Statistics, Artificial Intelligence, Machine Learning, Data Mining, Deep Learning, algorithms and systems as well as scientific methods to extract knowledge, get insights, analyze and interpret these data. To address these questions, the field encompasses different applications starting with preparing the data sets for analysis, analyzing the data, develop data-driven solutions, and present findings to inform high level decisions in a broad range of application fields. Thus, Data Science is often called to be the fourth pillar in the spectrum of scientific methods, besides theory, research, and computational sciences. All these together makes Data Science a very diversified and fascinating field of research with versatile challenges. Furthermore, you can be creative and place your own ideas to solve problems and generate solutions.

Focal area of teaching and research

The Master's program Data Science at the University of Basel offers a solid fundamental theoretical knowledge in mathematics and statistics combined with practical applications in managing and processing huge volumes of data sets. Students enrolling to the Master's program will enjoy a modern curriculum combining the whole data science methods like mathematical foundations, machine learning as well as managing and processing big data with excellent teaching and close links to current research. Due to the synergy with the Center for Data Analytics the students can write their Master's thesis based on real, cutting-edge data. Graduates of the Master's degree program are offered a wide range of job opportunities where they can apply their broad-ranging knowledge, e.g. in the IT, pharmaceutical, chemical, and financial industry, banking and insurance companies, museums and lots of other occupational fields. The studies also convey the fundamentals for an entry into research and academia.

Course structure Master studies

The Master of Science degree is a postgraduate degree that requires a successfully completed Bachelor's program. 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 the qualification of the Master of Science in Data Science, and potentially a subsequent PhD, you acquire an excellent foundation for a very broad range of occupational fields. As the field of Data Science is very interdisciplinary the career opportunities make activities possible in the IT industry as well as in pharmaceutical, chemical and healthcare industry. Research positions in industry and academia,

leadership positions in academia and also job opportunities in banking and insurance companies, in the automotive industry, in government and administration as well as in policymaking are feasible.

Admission

The following degrees of a Swiss university with a minimum average grade of 5.0 (Swiss grading system 1 to 6, where 6 = max./4 = pass) allow for direct admission to the Specialized Master's degree program Data Science:

Bachelor of Science in Computer Science, Mathematics or Computational Sciences. Graduates from one of these programs at the University of Basel will be admitted without additional requirements if the following academic achievements are proven:

75 CP basic knowledge in Mathematics and Computer Science form the following areas:

- Analysis und Linear Algebra (at least 20 CP)
- Numerical Analysis (at least 4 CP)
- Probability and Statistics (at least 8 CP)
- Programming (at least 12 CP)
- Algorithms and Data Structures (at least 6 CP)
- Databases (at least 4 CP)
- Scientific Computing / Pattern Recognition / Machine Learning (at least 6 CP)
- Scientific Communication (at least 3 CP).

For all other Bachelor's degrees from a recognized university the curriculum committee verifies the equivalence of the required knowledge in Mathematics and Computer Science according to the aforementioned list. The Bachelor's degrees in Computer Science and Mathematics from the University of Basel serve as reference.

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.

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: www.unibas.ch/admission

Application

Application under www.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: www.unibas.ch/Rueckmelden

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

Further information

Further information concerning the studies

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

Information about the University of Basel

- The course directory can be found under: www.unibas.ch/en/Studies/Course-Directory.html
- Basler Studienführer: www.studienberatung.unibas.ch
- Website: www.unibas.ch

Student advice

Questions regarding the studies of Data Science can be discussed with the study coordination of the Master's program Dr. Sabine Meinel (T +41 61 207 57 29, sabine.meinel@unibas.ch).

Contacts

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Imprint

Editorial: Student Advice Center Basel. Edited by Dr. phil. Nathalie Bucher in collaboration with Dr. Sabine Meinel, May 2024
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