



Data Science

Master of Science

## Studying in Bielefeld

As a university internationally regarded for its top-level research and innovative teaching concepts, Bielefeld University makes a significant contribution to a progressive and participatory knowledge society. It is an attractive, family-friendly place to work and study and is characterized by an open communication culture, lived interdisciplinarity, diversity and freedom for personal development.

Around 25,000 young people study at the 13 faculties of Bielefeld University, which cover a wide range of subjects in the humanities, natural sciences, social sciences and technology. In addition, a medical faculty is in the process of being established. A degree at Bielefeld University opens doors for young people to national and international job markets. With a variety of subject combinations in the Bachelor's programme, a broadly-based catalogue of elective courses and an interdisciplinary Master's programme students can look beyond the bounds of their subject. Through their academic studies, they not only acquire specific specialist knowledge, but also the ability to think critically and analytically, to reflect upon and to solve problems. These skills are particularly important in preparing them for the challenges arising from an ever more rapidly changing job market. With this in mind, Bielefeld University attaches great importance to the teaching of civil courage, respect, willingness to take responsibility and the ability to work together constructively.

## Living in the loveable city of Bielefeld

With more than 335,000 inhabitants, Bielefeld is one of the 20 largest cities in Germany. Bielefeld is greener than almost any other major city - thanks to its location in the Teutoburg Forest and its numerous parks and green corridors, which wind through the city with long hiking routes. If it is the buzz of urban life you seek, there are plenty of bars, clubs and cultural activities at Siegfried Platz - affectionately known by the locals as 'Siggi' - in the west of Bielefeld, at Kesselbrink and on the Boulevard. The mixture of urban flair and almost village-like harmony that makes Bielefeld what it is: an especially loveable city to live in.



## Studying Data Science in Bielefeld

In light of the constant increase in data volumes and data complexity, aspects of data analysis are becoming increasingly important, such as the handling of large amounts of data, statistical modelling, visualisation, pattern recognition using machine learning, but also ethical and legal questions. Data scientists are urgently needed for many socially significant developments, e.g. in the areas of intelligent vehicles or housing, artificial intelligence or social media.

The extraction of information from data is a genuinely interdisciplinary process: The collection of data and the communication of the results of the analyses need to be linked to the domain from which the data originate. The processing and analysis of the data requires a combination of computer algorithms and statistical methodology.

With the Master's programme established on the initiative of the Centre for Statistics (ZeSt) and the Faculty of Technology this interaction is put into practice. The aim of the programme is to enable graduates to comprehensively supervise a data-supported decision. The English-instructed programme is supported by the Faculty of Business Administration and Economics and the Faculty of Technology.

The programme is addressed to Bachelor graduates interested in statistics and information technology who would like to deepen and broaden their knowledge.

## Student counselling service

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## Options

The Master's degree (120 credit points) deepens the competences and knowledge acquired in the Bachelor's degree and serves to develop the thematic focus. The Master's programme Data Science concludes with the Master of Science (M.Sc.).

Students receive interdisciplinary training: classical statistical methods, programming, database systems and methods of the machine learning form the basic methodological framework. This is supplemented by practice-related courses, e.g. in the areas of statistical consulting and business analytics, research-related courses and courses such as a research colloquium as well as events dealing with ethical, legal and social implications. The programme thus gives interested students the opportunity to consolidate and deepen their knowledge in the field of statistics and information technology at a demanding level.

The Master's degree programme (taught completely in English) is divided into a socket phase and a profile phase. Due to the interdisciplinary orientation of the degree programme and the different competences of beginning students associated with it, the socket phase is made up of differently oriented introductory modules. In the following profile phase, all students deal intensively with basic statistical and information technology methods and deepen their knowledge in specific areas, depending on their interests, in order to acquire a versatile spectrum of methods of statistical and information technology methods and on the other hand to adopt the special perspectives of the individual application areas. A research colloquium and a reading course provide students with a general overview of the current state of research in the field of data science. The multi-layered curriculum is supplemented by practical courses, e.g. in the areas of statistical consulting and business analytics. By prior arrangement, credits provided abroad can be easily integrated into the Master's degree programme.

Students are offered various opportunities to gain international experience and intercultural competence. The Erasmus+ Programme enables them to study at universities throughout Europe. Bielefeld University also maintains international cooperation and partnerships with universities on all continents. The International Office advises on all questions concerning the choice of study location, scholarships abroad and applications.

## Requirements and application procedure

In order to be admitted to the study programme, students must successfully participate in the application procedure. This procedure establishes suitability for the course and which candidates gain admission. As part of the application process, it is checked whether the applicant has obtained the first university degree that qualifies them for admission. The student must prove this by submitting the degree certificate and any associated documents (Transcript of Records, Diploma supplement or similar). For further information on the admission requirements or the submission of additional documents (language requirements, statements on qualification, exposé, project drafts, etc.), please refer to the current subject-specific regulations of the course programme to be studied on the website of Bielefeld University. This website also specifies regulations on how the individual criteria are evaluated and weighted.

The standard duration of studies is four semesters. The course programme may only be started in the winter semester. This course has restricted admission (local-NC). For the allocation of study places (admission procedure), the overall result of the above-mentioned admission procedure is usually applied and a corresponding ranking is established. In exceptional cases, further criteria will be considered. Information on the structure of the admission procedure can also be found in the subject-specific regulations.

The application procedure is carried out via the online application portal of Bielefeld University.

Information on the application deadline: [www.uni-bielefeld.de/bewerbung](http://www.uni-bielefeld.de/bewerbung)  
Further information can be found in the flyer *Studieren an der Uni Bielefeld*.

## Doctoral Studies

Doctoral studies are particularly relevant for students who are aiming for an academic career after graduating with a Master's degree. This serves the further development of innovative research and consists of an independent scientific research project (dissertation) and an oral examination (disputation). In order to provide the best possible support for doctoral studies, Bielefeld University is continuously expanding and strategically developing its dense network of international and national graduate colleges and structured doctoral programmes.

The Faculty of Business Administration and Economics offers optimal conditions for this. There are two types of doctorate:

- doctorate with individual profile
- as part of the structured doctoral program of BiGSEM

Both forms focus on their own research activities. They are completed with a doctorate in economics (Dr. rer. pol.). Doctoral students can be employed at a chair or but also doctorate externally, the work can also be carried out in cooperation with non-university institutions. The Bielefeld Graduate School of Economics and Management (BiGSEM) offers a structured, internationally oriented doctoral program. Within the framework of international cooperation programmes will also be jointly developed under the umbrella of BiGSEM. Degrees awarded with various leading European universities.

### Further information

[www.uni-bielefeld.de/nachwuchs/promovieren](http://www.uni-bielefeld.de/nachwuchs/promovieren)  
[www.bigsem.de](http://www.bigsem.de)

## Career prospects

In today's information society, the demand for data analytical methods is constantly growing. Terms such as Big Data, Industry 4.0 and Internet of Things are examples of the constantly growing importance of data-supported decision-making and optimization processes, especially in industry. Hal Varian, chief economist at Google Inc., said in 2009:

*"I keep saying the sexy job in the next ten years will be statisticians."*

In the meantime, the focus has shifted in part from classical statistics to the more interdisciplinary area of data science. For graduates, there are a wide range of job opportunities in private, public and social organizations of all sizes.

## Research at the Faculty of Economics

An analytical-quantitative approach characterizes the current research at the faculty.

Among the established focuses of research is Computational Economics - a field in which the faculty is a top player in the international research landscape thanks to its highly visible profile and its success in raising third-party funding. Robust decision making under uncertainty is another established focus mainly carried by the Centre for Mathematical Economics (IMW). The research on Distribution, inequality and heterogeneity that is oriented to both social theory and economic policy is a Faculty tradition. Both decision-making theory and heterogeneity are at the center of research in economics in general. Thus Bielefeld's engagement with these issues is certainly not unique.

However, the Faculty has been exceptionally successful and innovative in these areas, which is reflected in its publication output and successful bids for third-party funding (including DFG, EU, ZIF) and makes them important research focuses of the Faculty. All three research areas boast an impressive network with national or international research partners.

The more recently established subject area Economic implications of smart products and smart systems is co-ordinated by the Institute for Technological Innovation, Market Development and Entrepreneurship (iTIME).